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IMPROVED OILERS.

At A, in the engraving, is represented the body of the Oiler, which is hemispherical in form, and is made from the best quality of heavy tin, brass, and zinc, without seams or apertures, consequently is not subject to leakage by being bruised. B is the flexible cover which is improved by raising and rounding it in its centre at C, which allows the oil to flow into the discharge tube more freely. D is the discharge tube made in the usual manner with the exception of the collar E, used to place the fingers upon to expel the oil. The principal improvement consists in the arrangement of the parts which prevent the flexible cover from being "*set*" or injured by pressing upon it to expel the oil, or by its falling accidentally. The arrangement is as follows: F is a straight pipe with apertures in its sides to allow the oil to pass from the body of the oiler into the discharge tube. This pipe is made of suffitient length to extend from the bottom of the inside of the oiler up through the screw G, which is fastened to the discharge tube,

OLMSTED'S PATENT OILER.

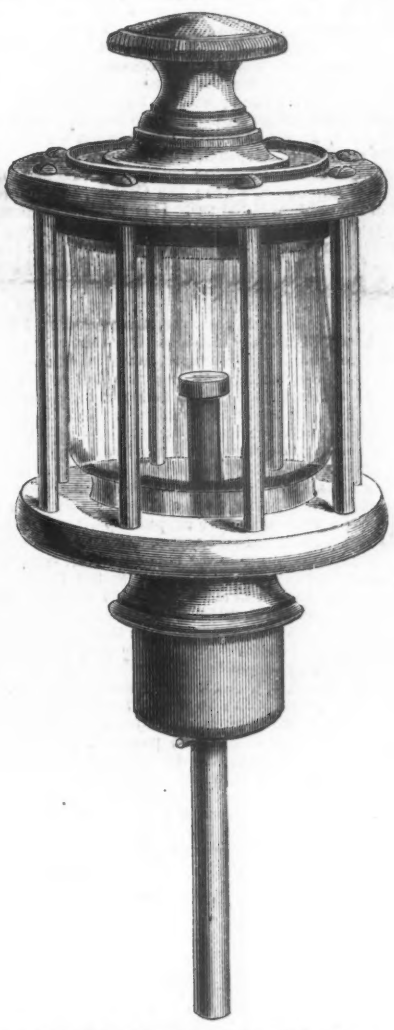
and it is brought to bear against the inside of the tube. It is then soldered fast to the screw, and makes what is usually the weakest part of the oiler, the strongest, namely, where the discharge tube is fastened to the screw. Upon the inside and at the bottom of the oiler, at H, is fastened a weight which has a stud cast upon it, which stud passes into the straight pipe and serves as a guide for the discharge tube, and keeps it in a vertical position to the oiler at all times, so that when the flexible cover is pressed down to expel the oil, it insures its being pressed equally all around, thereby preserving its flexibility. The weight also causes the oiler to assume an upright position when left unobstructed. There is just enough space between the end of the pipe F, and weight H, to allow the flexible cover to be moved sufficiently to expel the oil. When the flexible cover is pressed down the end of the straight pipe comes in contact with the weight, and any further pressure which may be applied, cannot injure the flexible cover. These oilers are manufactured by JAMES H. WHITE, of Newark, N. J., who has a model establishment for the manufacture of all descriptions of oil cans and feeders, dies, castings and small wares generally. Although the works are not extensive, still they are so well supplied with the newest and best of tools, and possess such excellent facilities for this description of work, that every mechanic would be pleased with what is to be seen in what may be termed a small model establishment.

Earthquake Waves on the Pacific.

An earthquake wave which followed the recent eruption in the Sandwich Islands, was transmitted to this coast and recorded on the Government self registering tide gauges at San Diego, San Francisco and Astoria, in about five hours. On the 23d of December, 1854, a similar wave was transmitted from the coast of Japan to the Golden Gate in 12 hours and 38 minutes. It will be recollected that this earthquake wave caused the wreck of the Russian frigate *Diana* in the port of Simoda, and great loss of life. These facts, which are derived from the best authority, convey a very impressive idea of the tremendous power required to disturb the whole body of an ocean, for a distance of from 3,000 to 5,000 miles by a movement distinct from its ordinary tidal swing. It will be seen that the revulsion of the great tidal wave at Hawali reached this coast, distant over 2,000 miles, in five hours, and was observed along a stretch of shore over thirteen geographical degrees in length—*San Francisco Bulletin.*

AUTOMATIC LUBRICATORS.

It is one thing to possess good machinery and another thing to preserve it in proper condition. We know manufacturers



PATENT AUTOMATIC LUBRICATOR.—Fig. 1.

who make it a rule to purchase the best of machinery for their particular business, and who pay the highest price for the same; but no sooner is this machinery delivered on their premises than the parties who should feel interested in its appearance and preservation, seem neglectful and careless about keeping it in good order. As a result of this, we constantly see pools of dirty and coagulated oil, on floors, shafting, bespattered with grease, and hard incrustations of oil and dust on the collars and shoulders of journals. We know that by proper attention on the part of employees, and enforcement of discipline from employers, annoyances of this kind can be prevented. Imperfect and irregular lubrication causes much trouble in mills and factories, and adds greatly to the expense of running the machinery. Oil-cups and oil-feeders, which allow the oil to drop on the journals and parts that require lubrication when the motion of the machinery is stopped, of course waste a large amount of oil, and yet there are thousands of such oil-feeders, that feed during meal hours and intermissions of labor. The annexed engraving, Fig. 1, represents an oil-feeder or lubricator, which feeds only when the machinery is in motion and when, of course, it requires constant and regular lubrication. The body, or cup, containing the oil is made of glass, and being transparent, allows the state and quantity of oil to be observed. This sort of glass cup can be protected by brass rods. At the bottom of this cup is placed a cylindrical hollow tube in which a solid steel rod is inserted, and suspended from a collar on its upper end. The lower end of the steel rod is made to rest on the bearing.

These lubricators are made in different forms—one of which is seen in Fig. 2.

The oil receptacle, A, is of glass, either incased in an ornamental frame of brass, or supported by a brass cap and stem. The cap, B, is for filling the oil cup, and when screwed on, is air-tight. The stem or pipe, D, receives on its exterior a wooden cone, E, for the purpose of attaching it to the box. Through the hollow stem, D, passes a wire, F, which may be called a feeder; the lower end of the wire resting on the jour-

Fig. 2.

nal of the shaft, and receiving a jarring motion from the rotation of the shaft. This motion allows a sufficient quantity of atmospheric air to pass up through the annular space between the pin or wire, F, and the interior of the stem, D, to assist in the downward movement of the oil, while the motion itself adds to the same result. The various kinds of oil used renders it impossible to place a rod in that will exactly suit the flow of the different kinds, as the flow will vary according to the kind or quality. If the oil does not flow exactly right—after a trial of one day—the rod can be changed to the size required. No attention is required beyond seeing that the cup is supplied with oil.

Testimonials from practical men affirm that a saving of fifty to seventy-five per cent. is gained by the use of these lubricators. The device was patented by J. R. Dreyfus, May 21st, 1867. All further information may be obtained from Messrs. Nathan & Dreyfus, 108 Liberty street, New York City.

Cutting Glass by Hot Air.

According to *Les Mondes*, the use of hot air, or gas, for cutting glass, is a new and useful invention, already utilized by the Crystal Company of Balcaret. The hot gas issues from a pointed or flattened tube, and is driven directly upon the goblet or other object to be cut, which is placed in close proximity to the tube, and made to revolve upon its axis. A narrow circle of heated glass is thus formed upon the object in question, which being damped immediately afterwards, causes the glass to divide with extreme neatness at the part thus heated. The operation is more rapid and effectual, we are told, than any means hitherto employed for this purpose.

Superiority of American Cast-Steel.

Experiments just made at the Navy Department, Washington, with cast-steel, resulted in favor of an American brand—that of the Black Diamond Company, Pittsburgh, Pa.—which stood the extraordinary test of 242,100 pounds tensile strength to the square inch, being the highest on record, and showing a superiority over English manufacture.

Mining Summary.

The Mineral Resources of the United States East of the Rocky Mountains.

OFFICIAL REPORT OF U. S. COMMISSIONER TAYLOR.

WASHINGTON, May 2, 1868.

SIR: In pursuance of your instructions of September 12, 1866, I had the honor on the 13th of February, 1867, to present for your consideration a preliminary report, embracing a general view of the gold and silver districts of New Mexico, Colorado, Montana, Dakota and Minnesota, with some notice of the gold regions of the southern Atlantic States, Canada and Nova Scotia. The present report will include a further inquiry into the mineral resources of those districts, with special reference to their situation and prospects at the expiration of the year 1867; and I propose as a not inappropriate sequel to devote a considerable portion of this communication (1) to a general review of the production of gold and silver in other quarters of the world, with the purpose of indicating relatively the commercial and social importance of the treasure product of the United States, and (2) to a summary of the domestic commerce from the Mississippi river westward to the interior or mining districts of the United States, having reference prominently to railway communications with the Rocky mountains and the Pacific coast.

THE GREAT PLAINS.

Between the agricultural districts of Dakota, Nebraska, Kansas, Indian territory and Texas, which extend westwardly to the 98th meridian of longitude, and the eastern Piedmont of the Rocky mountains, and in Colorado are bounded eastwardly by longitude 104°, the cretaceous formation, once designated as the "American desert," is now well understood to be adequate for the sustenance of cattle, and if subterranean sources of water supply were available for the purpose of irrigation, might become an agricultural region. At present this wide interval between the margin of the Missouri river, where the moist winds from the Gulf of Mexico afford a sufficient fall of summer rain for the growth and maturity of crops, and the Colorado Piedmont, with its limited capacity of irrigation from mountain streams and surfaces, is recognized as a grazing district, bearing the nutritious buffalo grass, and reasonably traversed by streams—conditions only favorable to pastoral occupation and a sparse population. If, however, the experiment of artesian wells should be vigorously prosecuted, and prove successful, the occupation of the plains might be greatly diversified. The government in 1858 despatched a party under the direction of Captain John Pope to the Llano Estacado of western Texas, an extension of the cretaceous formation of Eastern Colorado, for the purpose of sinking an artesian well; but although a depth of 1,050 feet was attained, and powerful streams flowed into the well at different levels, the water did not rise to the surface, and the work was abandoned. It was by no means a failure; the discovery of subterranean streams or fountains accessible, from the surface, being very suggestive of the possibilities of future water supply.*

NEW MEXICO.

During 1857 the public attention was occupied by very favorable reports of the mineral resources of New Mexico. The Kansas division of the Union Pacific railroad, while not relinquishing the policy of direct western communication of Denver and Great Salt Lake City, determined to place a party in the field to explore a southwestern line from the junction of longitude 102° with latitude 39° to a crossing of the Rio Grande at Albuquerque, latitude 35°, longitude 106½°, and thence westwardly through New Mexico, Arizona and southern California, on or near the 35th parallel.

The results of this exploration fully confirming the observations of Lieutenant Whipple in 1853-'54, have established that gold, silver and copper mines are as numerous and valuable as in Colorado; and also that beds of lignite coal occur around the western end of Raton mountain, and the neighboring foot-hills of the Rocky mountains, while a formation of early cretaceous coal has been discovered in the valley of the Rio Grande. The first coal basin consists of an immense thickness of coarse sandstones, first manifesting themselves in some of the ravines of the Raton, about 20 miles east of Raton Pass, but soon becoming visible on the flanks of the mountain, continuing through the pass, and to an unknown distance west of it. This formation lies nearly horizontally against the base of the Raton and Rocky mountains, extending the latter from the Arkansas river at Cañon City to the valley of the Little Cimarron on the South. In the Raton Pass the coal beds, which are quite thin in the Manco del Barro Pass, begin to assume importance. About six miles from Trinidad, a locality exhibits a total thickness of about five feet of good coal, separated into four beds, placed near together. Near the top of the pass are also beds of the same thickness, but at the southern exit of the pass, in cañons connected with upper waters of the Canadian, there called Red river, these beds occur in still greater magnitude, being eight feet thick. All these are, however, of trifling nature compared with the great beds found in the cañon of the Vermejo valley, which show in one locality 10 feet of coal in two beds, separated by 10 inches of slate. The same strata was found on the other side of the cañon, one-half mile distant, and in other cañons several miles westward. Further south other thinner beds were seen near Vermejo of the thickness of three and four feet of good coal. Beyond the Pernego the high table lands containing the coal beds disappear entirely, and the only sedimentary rock in view is the early cretaceous limestone. As the high table land of tertiary sandstone extends north of the Raton, it is probable that similar beds exist in that direction. Coal has also been discovered on the Rio Grande in various places above Piedras Negras, as well as below in the vicinity of Laredo, Gurrero, and Roma.†

The discoveries of gold-bearing quartz, first limited to the Gregory district, in Colorado, extending about 30 miles along the base of the Snowy range, from Gold Hill to Empire City, now reach the southern limit of Colorado, and thence along the Sierra Madre, following the general course of the valley, of the Rio Grande through the whole extent of New Mexico and into the adjacent State of Chihuahua. Successful placer mining by the Mexican residents of this valley has often been reported in the mountain gulches near Santa Fé, south to a distance of about 100 miles, or so far as Gran Quivira, and north for about 120 miles to the river Sangre de Cristo. This stream is just within the territory of Colorado, but twenty miles south of the boundary line is the locality of the Moreno mines, which attracted much attention during 1867. They are situated near but west of the Raton mountains, about thirty miles north of Taos, Moro county, New Mexico. Four pounds of the ore from a well-defined quartz vein recently opened are said to have yielded seventy-eight cents of gold, or at the rate of $390 to the ton. An important circumstance is added, that the quartz contains only free gold, without sulphurets. In a specimen taken from the vicinity of the surface and forwarded to Colorado, thread gold could be traced through the mass of quartz. The opportunities for gulch mining have already attracted a considerable American population. The Placer mountain, about thirty miles from Santa Fé, within the past year has been worked under an efficient organization and with satisfactory results. The average yield of the auriferous rock is $30 to the ton. The veins are numerous, well-defined, and accessible within a district of ten miles square. Another locality of much interest is Pinos Altos, under latitude 33°, longitude 108°. The enterprise of working these mines seems to be under efficient direction. Upon one of the lodes a tunnel has already been drifted 713 feet, and when completed to the distance of 1,600 feet, will have passed from the Atlantic to the Pacific slopes of the Sierra Madre. Midway it passes under the crest of the mountain, from which a shaft of 121 feet connects the summit with the tunnel. The ore contains gold, silver, and a small proportion of copper. The village of Pinos Altos is at an elevation of 5,000 feet above the sea. The vicinity presents unusual advantages of wood, water, and surface for mining operations, and, with the fullest allowance for exaggeration as to the number and richness of lodes, there seems but little doubt that, with the pacification of the Indian tribes and further facilities of transportation, it will become an important mining centre.

The foregoing seem to be the most prominent gold-bearing districts of New Mexico; but some twenty localities are mentioned by mining journals, among which are quartz veins at San Jose, in the Sierra Madre, intersecting each other in all directions for a mile in width and three miles in length; a similar formation near Fort Davis, Texas, and extensive placer mines on the San Francisco and Mimbres rivers.

Silver, however, with its many combinations, is the most abundant mineral of the Territory. The prominently argentiferous districts are the Placer mountains, near Santa Fé; the Organ mountains, near the Mesilla valley; and the Sierra Madre, at Pinos Altos. The first and last of these localities are, as we have seen, gold-producing also. In the Organ mountains over fifty silver mines have been discovered, the ore being generally argentiferous galena. The district near Mesilla valley, in the Organ mountains, has a mean altitude of 4,400 feet, and is intersected with ravines, affording favorable opportunities for horizontal drifts in opening the veins. The country bordering on the north portion of Chihuahua is a rich silver district. Immediately adjoining the Mexican boundary are the mines of Corralitos, the most successful siver mines in the State of Chihuahua, having been mined for forty years in a region most exposed to Indian hostility. Near the old town of El Paso tradition places the locality of one of the richest silver mines known to the Spaniards, but its site was lost during the Indian insurrection of 1680.

Dr. A. Wizlizenus, who accompanied a military expedition in 1847 as surgeon and naturalist, mentions that during the Spanish occupation several rich silver mines were worked at Avo, at Cerillos, and in the Nambe mountains, but none at present. Copper is found in abundance throughout the country, but principally at Los Tijeras, Jemas, Abiquin, Guadelupita de Mora. Iron is equally abundant. Gypsum, both common and selenite, is found in large quantities, extensive layers of it existing in the mountains near Algodones, on the Rio Grande, and in the neighborhood of the celebrated Salinas. It is used as common lime, and the crystalline or selenite is a substitute for window glass. About 100 miles southeast of Santa Fé, on the high table land between the Rio Grande and Pecos, are some extensive salt lakes or salinas, from which the inhabitants of New Mexico are supplied.

The leading copper mines of New Mexico may be thus enumerated and described: 1. Hanover, discovered in 1860; situated on the headwaters of the Mimbres river, about six miles east of Fort Bayard; ore a virgin copper, found in extensive pockets in the bed rock, varying in quantities from 100 to 300 pounds, and combined with sufficient gold to defray the expenses of working. 2. Santa Rita, in the same vicinity, worked by the Spaniards nearly a century and a half ago; ore a rich oxide, and found in veins of varying thickness, the lower being virgin copper, which can be drawn under the hammer as it comes from the mine; supposed to be an extension of the Hanover. 3. Pinos Altos, associated with the extensive gold and silver formation previously mentioned; a very extensive copper deposit, and favorably situated in respect to wood and water. 4. Arroyo Honda, situated north of Taos and close to the Colorado line, from which specimens of copper have been exhibited at the United States mint and pronounced equal to the amygdaloid of Lake Superior. 5. Naciemento, situated about forty miles south-southwest from Santa Fé, in the Los Valles mountains, in the same range as the Placer mountain; vein from thirty to forty feet wide, and occasionally intersected by deposits of white sandstone; assay of ore, copper, 71; silver, 4; iron 12; unexamined scoria, 13. 6. Ocate, near Santa Fé, vein twelve to twenty feet wide and assays sixty-four per cent, of pure copper. 7. Tijera, situated in the Tijera cañon, near the line of the 35th parallel; surface ore alloyed with silver, but in descending the copper combines with gold. 8. New Mexico, a formation of the Placer mountain, very extensive, and under the same administration as the gold mines in that locality. For many years much of the copper ore of New Mexico has been transported to Indianola, Texas, a distance of 1,000 miles, and the amount of the gold associated with the copper has always been sufficient to defray the expenses of transportation.*

COLORADO.

This interesting Territory has been fortunate during the year just closed in the publication of an attractive picture of its mountain scenery, by Bayard Taylor; an exhaustive work upon its "mining organizations and prospects," by O. J. Hollister; and a careful collation of its mineral and other products at the Paris Exposition, under the direction of Commissioner J. P. Whitney. Very free reference will be made to these authentic sources of information.

The agricultural section of Colorado, called by its people the valley, extends eastward from the base of the Rocky mountains, with an area of 30,000,000 acres, of which one-sixth is susceptible of irrigation, and is therefore arable. The next division is the Foot-hills with its subdivision, the great mineral belt. Then follows the Snowy range, or the range with its system of parks—the crest or sierra of the mountain mass—while "over the range" includes all west of the continental divide. The entire area is 103,475 square miles, or 67,723,520 acres.

Until recently the gold formation of the Foot-hills was the first object of interest to mineralogists after leaving the plains; but, with the extension of the Union Pacific railway, the probability of an adequate coal formation fully divides attention. With the exploration of the valleys which debouch from the first elevations of the Rocky mountains a lignite has been discovered upon the Yellowstone of Montana, the Platte of Colorado, and the Rio Grande of New Mexico, while within the parks, at a greater elevation deposits are found similar to the Albertine coal of New Brunswick upon the Atlantic coast. It is not unlikly that the bituminous beds of Iowa and Missouri, disapearing under the cretaceous masses of the plains, may reappear with the upheaval of the mountains in a condition highly metamorphosed, if not in the form of anthracite. The veins of lignite first mentioned have a general direction north and south along the base of the mountains, and are accessible where the mountain streams traverse the Foot-hills.

The most prominent discovery of coal in Colorado is on South Boulder creek, about two miles from the base of the mountains, 15 miles from Denver, and 15 miles from Golden City, the latter being the centre of the gold mining district. In regard to the character and quality of this deposit Dr. J. V. Hayden, United States geologist, reports that there are at least 10 beds from 5 to 13 feet in thickness, belonging to the tertiary period and of the lignite variety. It is non-bituminous and holds a position between dry wood and the anthracites of Pennsylvania; burns with a bright red flame, giving abundant heat and very little ash—2 per cent. of ash and 58 of carbon. Associated with these coal beds are veins of iron ore of the red or brown hematite. The value of coal and iron deposits, with reference to the construction and use of machinery for reducing and smelting ores, is quite apparent.*

The localities in which gold is most plentifully found are in the counties of Boulder, Gilpin, Clear Creek, Jefferson, and the extreme southeastern part of Summit. Although it is evident that many other sections contain gold-bearing veins no great amount of attention has been bestowed upon them, and the principal amount of mining has been done in the counties of Gilpin and Clear Creek. The gold veins proper, found wholly in granite formation, vary in width from a scarcely perceptible streak to 40 and even 50 feet, but seldom averaging over four or five feet. When discovered from the surface the vein is indicated by a light porous quartz, discolored by the oxidation of base metals, in which particles of gold are disseminated sometimes in the form of small scales, fine dust, or stringy pieces, but seldom in masses of any size. The value of veins is usually determined by the miners by crushing to a fine powder in a hand mortar a few pieces of surface ore, the powder being carefully washed with water in a hand pan. This consists in giving the pan a peculiar motion which settles the gold at the bottom, the fine particles of earth and quartz being carefully floated off. It is seldom that surface ore is found so poor as not to exhibit from a few pieces so treated, a streak of fine gold at the bottom of the pan. From some veins pieces can be readily found, by a little search, showing specks of gold up to the size of pin heads. Sometimes streaks of white and yellow earths are found in surface ores, which yield from $5 to $60 to the panful of 12 or 15 pounds. When such streaks are found large amounts are often obtained from them. The surface ore, generally quite soft and porous at the top, gradually grows harder and more compact as it recedes from the oxidizing effects of the atmosphere, and is finally lost in the glittering sulphurets of iron and copper which takes its place, being equally rich in gold, and oftentimes a vast deal richer, having in addition a large percentage of silver, and oftentimes an amount of copper equivalent to 25 per cent. of bulk. The surface ore, when found in veins of ordinary width and richness, is stripped from the veins until the sulphurets are met with and is submitted to the ordinary process of amalgamation on large copper plates coated with quicksilver, or in large iron or wooden pans, the ore being scoured by revolving spars of iron or masses of stone. In this manner surface ores are made to pay good profits, and in some instances very large amounts.

The tracts containing gold veins, designated as belts, seem to have a uniform course northeast by southwest, cropping out in some localities, and then disappearing from the surface to be found beyond in their continuation. In places, by some natural convulsions of nature at an early period, they are broken and distorted from the regularity which marks them elsewhere, and for acres in extent the surface of the earth is discolored by the peculiar blossom which indicates the presence of sulphurets below. Such tracts, when water can be brought to them, are sluiced to great profit.

A peculiarity of the Colorado gold veins is that they are invariably found richer the deeper they are sunk upon. This rule seems to be without exception, and in no instance is a vein lost except by a break-off in the adjoining formation. Gold is not found to any great extent in a free state after leaving the surface ores. The great percentage of the precious metal is found intimately associated with the sulphurets of iron, copper, silver, lead, antimony, and arsenic. Iron predominates over the other metals, often comprising from 30 to 40 per cent. of the crevice matter. Copper is almost invariably represented, and few veins show less than from three to five per cent. of this metal, and many exhibit from 15 to 20 per cent. This metal increases almost invariably as the veins are sunk upon, showing a tendency to assume the form of a sulphate as it descends. In the copper, particularly the sulphate, is found the greatest percentage of gold, often giving an assay exceeding $2,000 to the ton of 2,000 pounds. Miles of shafts have been sunk and tunnels run in Colorado, but no single shaft or tunnel has yet attained any great depth.

Shafts have been sunk upon the Gold Dirt, Bobtail, and Gregory lodes, to a depth of between 800 to 400 feet, in every instance exhibiting ore of surpassing richness. The great majority of shafts, however, from want of means and from ignorance of the true method of treating the ores found, have not been sunk more than sufficiently deep to demonstrate the value of the lodes they are upon.

The gold-mining regions are easily reached from the plains below, and are connected by good roads. Streams, having sufficient water and fall to furnish unlimited power for mining purposes, are plentiful. The valleys and agricultural lands, though being less sheltered and productive than those upon the western side of the range or the plains below, are sufficiently fertile to furnish more than a much larger population can consume. Timber, also, is plentiful, and the climate, though uncertain in its temperature during the summer, is not attended in winter with that severity which is peculiar to the Atlantic sea-coast towns of the same latitude.

Within the last year a considerable quantity of ore, taken from several mines, was freighted across the plains to the river, and forwarded to Swansea, in Wales, that it might be experimented upon by the skilled experience employed there. No difficulty was found in working the ore in Swansea, which gave yields of between $200 and $300 to the ton, the same ore not yielding over $10 or $15 to the ton by the stamp-and-pan mills in Colorado, yet paying a profit from that amount.

No accurate estimates can be made of the amount of gold obtained from Colorado, particularly during the earlier days, owing to the irregular methods of remitting in vogue; but probably not less than $30,000,000 have been obtained within the limits of the Territory from 1859 up to the present time—not a large amount when compared with the yield from other more advanced mining regions during the same time, but a large sum considering the small number of people engaged in obtaining it, their isolation from settled regions, their Indian difficulties, and the destructive influences of the civil war raging at the same time in the United States.

Silver is found in all the gold mining districts of Colorado, associated with the ores containing gold, in the galena particularly, which is found at times in considerable quantity. It is always present, but not sufficiently plentiful to be a feature of value in the gold mines; yet large masses have lately been obtained by the smelting process from ores considered strictly gold-

* In 1867, at Chicago an artesian well, at the depth of 1,190 feet, struck a subterranean stream, eight feet in depth, and flowing with a strong current, from which 600,000 gallons daily are delivered at the surface, and 450,000 gallons daily at an elevation of 45 feet. Previously a vein of water had been reached at a depth of 90 feet, which yielded 15 barrels an hour. (See Appendix No. 1 for a narrative by Professor D. D. Owen of other experiments within the United States and elsewhere.)

† The value of coal in the reduction of ores, as well as for uses of fuel, justifies all possible details of the recent discoveries in the Rocky mountains. The foregoing report is by Dr. J. L. Le Conte, who accompanied General W. W. Wright, chief engineer of Union Pacific railway, eastern division, upon the expedition already mentioned.

*Letter to Philadelphia Press from member of Pacific Railway exploration in 1867.

* See appendix No. 2 for an abstract of Professor Hayden's observations on "The Lignites of the West," originally published in Silliman's Journal of March, 1868.

bearing, and it is quite evident that in future, with the advantages of improved processes, this metal will be freely obtained. But not within the last two years was it generally known in Colorado that immense belts of silver veins, separate from the gold, existed upon the western declivities of the Rocky Mountain range, corresponding in their direction and general features with those of gold upon the eastern side. The prevailing great richness in silver in the ores of Griffith and Argentine districts, in Clear Creek county, upon the head waters of the South Clear creek, some 13 miles distant from the towns of Central and Black Hawk, and correspondingly near to the snowy peaks of the range, first attracted particular attention to the element of silver. In these districts silver ores of great richness have been discovered, masses being exhibited at the Paris Exposition from the Baker lode, of Argentine district, and of the Elijah Hise and Endigo lodes, of Griffith district, which assay respectively, in silver alone, $532 12, $1,656 20, and $1,804 83 to the ton of 2,000 pounds of ore. These veins were followed to an altitude previously unknown to mining experience in Colorado. Enterprising men were soon engaged in prospecting the regions corresponding upon the other side of the range, which resulted in the discovery of immense deposits of rich argentiferous galena. The black sulphurets of silver, antimonial silver ores, rich chlorides, ruby silver ore and pieces of native silver were found, and a new region, the extent of which has not yet been determined, was thrown open to the attention of those who might have the curiosity to examine it.

Much excitement was occasioned in Colorado by this discovery, and a large number of prospectors were soon engaged there, making discoveries and preemptions under the liberal laws of the Territory, which gave undisputed possession to discoverers who should have their claims recorded in the county office, after making the developments and improvements required by law.

That portion of the silver region first opened is situated in Summit county, upon the head waters of the Snake and Swan rivers, which flow into the Blue river, a tributary of the Rio Colorado, which flows into the Gulf of California. An examination of the region a few miles southwest, in the neighborhood of Ten Mile creek, another tributary of the Blue, led to the discovery of still more wonderful exhibits of mineral wealth than were found in the Snake river region. Veins of great width and prominence were found, which, in some instances, could be distinguished by their discolored surface ores, when miles distant, seaming the mountain sides like gigantic roads, measuring from 20 to 50 feet in width. In this region the result of violent volcanic action is evident by the great height of many peaks, their abrupt and broken sides, and by the immense masses of lava and scoria which abound. Not far distant are hot saline and sulphur springs, as well as deposits of dry salt.

Fletcher mountain, in Ten Mile district, where the richest mines yet discovered are found, may be designated, if the application be a proper one, the predominant peak or watershed of the continent. From each side of this mountain rise streams, (Gilpin and Clinton,) which, originating at an altitude of over two miles above tide water, in a region teeming with mineral wealth, seeks the shores of the Pacific through a region which is one vast field of metallic treasure, but which lies deserted, neglected, and comparatively unknown. Upon the western, near the base, are numerous rivulets, emptying into the Blue, another tributary of the Rio Colorado. Southward from Fletcher mountain a few miles, so near Ten Mile creek that the waters almost mingle, rises the Arkansas river, flowing into the Mississippi. To the south, not many miles further, rise the head waters of the Rio Grande del Norte, flowing into the Gulf of Mexico. At the southeastern base of Fletcher mountain rises the South Platte river, which, striking north, circles over the great plains, irrigating the soil in its passage, and supplying water to tens of thousands who yearly make their migrations to the promising lands of the far west.

During the short time which has elapsed since the discovery of the silver mining regions good roads have been made, connecting them with the more settled sections of the Territory, from Snake river mines to Denver, by way of Breckinridge, the county-seat of Summit county, and from Ten Mile district to Denver, by way of the Arkansas river and the South Park. In both sections a large number of shafts have been sunk upon the principal rivers to a depth of from 20 to 60 feet, some of which have exhibited an abundance of rich ore. In Ten Mile district miners were engaged during the past winter—in the employ of eastern capitalists, who subscribed a large sum for the purpose—in driving a tunnel from the base of Fletcher mountain to its centre, for the purpose of ascertaining, from ore taken at a great depth, the true value of veins which presented such indications of wealth upon the surface. This tunnel, commencing at a height of about 60 feet above the water-line of the district, had been driven through the solid rock (of which the mountains, beneath a thin coating of earth, are almost entirely composed) to a depth of about 300 feet, and will be steadily prosecuted until it reaches, at a depth of from 600 to 800 feet, a large vein known as the Campton, which exhibits upon the surface, for over a mile in length, a crevice, which has a uniform width of 10 feet, and which has given from shafts sunk upon it some of the richest ore obtained in the district.

From the silver mines of Summit county 76 assays were made during the past year by Albert Reichenecker, a graduate of the Polytechnic School of the kingdom of Wurtemburg, and who served the state government of that kingdom nine years as a chemist and engineer of mines, who obtained an average assay of $121 64 to the ton of 2,000 pounds; and deposes that said ores taken for assay were only a fair average of the ore from the mines from which they were respectively taken, and that they came from a depth not exceeding 20 feet, and in most cases from within five feet of the surface.

From thirty assays, made by Fred. Eckfeldt, melter and refiner at the United States branch mint at Denver, an average assay was obtained of $130 28 to the ton of 2,000 pounds; Eckfeldt deposing that the ores so assayed were but a fair average of the mines from which they were taken.

The silver mining regions abound in many streams, which have their sources in the immense masses of snow found always upon the high mountain peaks. These streams, being fed by thousands of small rivulets and springs, gain in a short distance immense force and volume, giving unfailing freshness to the rich grasses, flowers, wild fruits, and lofty trees found in the valleys they traverse.

At a height of 12,000 feet, in these regions, timber disappears, though rich pasturage and flowers are found growing close to the banks of snow. Strawberries are often found growing in great abundance far above the timber line, as well as raspberries. The timber above an altitude of 8,000 or 9,000 feet is principally fir and spruce, which is quite abundant, and grows to a great size. The native grass is of an extremely nutritious quality, and for hay cannot be excelled. It grows high and vigorously, and in the valleys and parks can be cut in great quantities. Trout are found in the streams at a height of nearly 12,000 feet, and a variety of wild game is abundant. The climate is less severe in the silver regions than at the same altitudes upon the eastern side of the range, owing to the high mountains which intervene, and which form barriers against the sweeping winds of the plains. Settlements are rapidly being made in those sections, and soon they will resound with the busy labor of thousands who will be required to develop the wonderfully rich and accessible treasures of which now the existence is comparatively unknown.

Lead, in the form of galena, exhibits itself in many of the gold mines, but diminishes in quantity as the shafts sink. It is more plentifully found in Ten-mile district, Summit county, than in any other section yet known. In that district it is in some instances found projecting in large masses above the surface of the earth upon the line of vein, and can be detached in a partially oxidized condition in pieces weighing from 500 to 1,000 pounds. Upon Fletcher mountain thousands of tons could be easily gleaned from the surface, and but a short distance below the surface are large beds, the extent of which have not yet been determined. This galena is never found free from silver, yielding from 10 to 500 ounces to the ton of metal.

From some pieces of galena, fair average ore from a number of veins in Ten-mile district, the following assays for silver were obtained by Professor A. A. Hayes, State assayer of Massachusetts:

		Oz.	*Dwts.*	*Grs.*
Pyramid vein	per ton 2,000 lbs.	81	13	8
Merrimac vein	do	68	12	0
Polygon vein	do	266	8	0
Hard Cash vein	do	108	2	12
Blackstone vein	do	85	18	6
Young vein	do	65	6	16
Finsley vein	do	178	17	0
Siberian vein	do	106	9	20
Augustine vein	do	221	3	12

giving an average exceeding 130 ounces to the ton.

This metal, like copper, has not been mined for, except for the purpose of obtaining it to flux other metals with by the new smelting process.

Deposits of dry salt are found in some parts of the Territory, and salt springs are quite plentiful in the parks. The salt found in a dry state is comparatively pure, and the saline springs contain fully one half pound of salt to the gallon of water. Some of the springs are very large. In the South Park extensive works are erected and in operation for boiling and evaporating the brine. The spring from which the works are supplied is some 1,000 feet long by 150 feet wide, from the bottom of which the water boils up vigorously.

The following are altitudes above the sea of some towns and passes in Colorado:

	Feet.
Denver City	5,317
Golden City	5,882
Central City	8,300
Idado	7,800
Georgetown	8,452
Empire City	8,871
Pass over the range *via* Cheyenne	7,500
Pass over the range *via* Berthond	10,914
Pass over the range *via* South Park	11,000
Pass over the range *via* Boulder	11,700
Pass over the range *via* Jones	12,200
Pass over the range *via* Argentine	13,000
North, South, Middle, and San Luis Parks, from	6,000 to 9,000
Main belts of gold mines, from	7,000 to 9,000
Main belts of silver mines, from	8,000 to 11,000

About one half of the Territory is covered with timber, the growth in some sections being small and scattering, composed of the piñon, or nut-bearing pine, and scrubby cedar. These are confined to the lower foot-hills of the mountains. Higher up are found cedar, spruce, fir, and pine, which grow to an enormous size. Hemlock, aspen, and oak are also found. Plum and cherry trees are met with growing wild, and the apple and pear are being cultivated with success. Wild grapes, strawberries, raspberries, and currants are abundant, and heavy growths of wild clover, wild rye, and wild barley cover many of the valleys.

The records of the United States Land Office exhibit sales of 210,000 acres of farming land in the Territory, with 190,000 acres claimed but not paid for, making 400,000 acres under improvement. Of this number 100,000 acres are well cultivated. Wheat, barley, and oats yield from 30 to 70 bushels to the acre, and all varieties of vegetables are successfully raised. In 1865, for a number of months corn and oats sold readily at prices ranging from 15 to 25 cents per pound. In the summer of 1866 grains sold in Colorado at prices less than those ruling in Chicago, Illinois, the largest grain mart in the world. Eight or ten flour mills are now in operation, which are making more flour than the people of the Territory can consume.

Enough has been done in Colorado to satisfy any one of the true value of the countless and inexhaustible veins which so closely pack and seam her mountain sides, and the improvements which have been made there in so short a time must appear astonishing to any one who will examine them. But the great difficulties which have been encountered must be taken into consideration by those who review her mining processes; the interruptions of the war and Indian difficulties; the long distance and high rates of freight from the Missouri river, and the delay occasioned in getting the machinery ordered, which, being of novel construction, had to be manufactured expressly for the purpose. But these difficulties are happily now overcome by the cessation of war, by the building of railroads, and by the manufacturing establishments in the Territory, so that we may reasonably expect in the succeeding few years to see a more rapid and successful advance.

WYOMING, OR LINCOLN.

On the organization of Montana Territory, and the limitation of Idaho to districts west of the Rocky mountains, a region remained south of Montana which, for want of settlements or any form of public organization, was annexed to Dakota. It will probably be constituted a Territory at the current session of Congress, as important discoveries of gold mines have lately occurred in the valley of the Sweetwater and on the sources of the Wind river. The Cereso lode, near the South Pass, is the most prominent locality, and was the first scene of discovery. As much as $130 per day is claimed as the reward of one man's labor with a hand mortar. Some 150 lodes have been located, all within a circle of 6 by 15 miles, while the great mineral belt in which the mines are found extends from Fremont's Peak south to the junction of Grand and Green rivers. There seems to be little doubt that the foot-hills of the Wind River mountains are equally auriferous.

The Sweetwater mines are situated northeast of the old emigrant road which leads through South Pass and by the Pacific Springs, and are on the eastern slope of the Rocky mountains; and thus far only one ledge has been observed to cross the divide to the western slope of the mountains. The line of the Pacific road is 25 miles south of the mines—the telegraph within nine miles. A population of 600 passed the winter of 1867–'68 in this district; a newspaper, the Sweetwater *Miner*, has commenced its issues, and the federal government will probably be represented by territorial officers at an early day.

MONTANA.

So much interest is expressed in the mining development of this new Territory that I have sought and obtained the valuable assistance of W. S. Keyes, mining engineer, a resident of Montana, to present with some detail the narratives of mining discovery and enterprise upon the sources of the Missouri. His communication is embraced in the appendix to this report.

In estimating the annual product of the precious metals from Montana I adopted a rate, which did not seem entirely arbitrary, of doubling the mint deposits for the year ending June 30, 1866. These were $5,505,687 30, and on this basis the production of that year was assumed to be about $12,000,000. I am still of the opinion that this method of estimate is fair, and reasonably accurate in respect to gold, while, as to silver, so little is ever demanded for coinage that a much greater proportion passes into consumption from private assay. The deposits of gold from Montana at the mint, in Philadelphia, San Francisco, and Denver, and the assay office in New York, for the year ending June 30, 1867, amounted to $6,595,419 15. This amount doubled would be $13,190,838 30, or with an addition of the probable quantity of silver, it may be stated at $13,250,000.

Professor Keyes accepts a calculation by N. P. Langford, Esq., collector of internal revenue, based on population in 1867 which is reported at 24,000. Assuming an average population of 22,500 since 1864, and that the average cost of living is $750 per annum, these gentlemen infer that the population must have received from the mines the annual aggregate of $16,875,000. In the English mining colonies careful statements of the number engaged in gold mining are preserved; but the record in Australia, for 1867, only returns £80, or $400, per miner. There is probably no industry in the world so precarious, and in which there is so much time passed without productive results. Apply the Australian ratio to the entire average population of Montana, as above stated, and we have $9,000,000 per annum since 1864—a statement which is only $3,000,000 in excess of the estimate in my last report. The foregoing statement of $13,250,000, founded on the mint deposits of 1867, is more favorable to Montana than the estimate of Messrs. Langford and Keyes.

The area of the Territory is reported as 146,689½ square miles, equal to 93,881,184 acres—nearly the same as California, three times the area of New York, two and a half that of New England; and yet no greater proportion is claimed by local authorities as susceptible of cultivation than 1 acre in 30, or a total of 3,346,400 acres. Of course, a far greater surface will afford sustenance to domestic animals. The limit to agriculture, as in Colorado and New Mexico, is the possibility of irrigation.

Referring to the enclosed communication for further details, it is not deemed inappropriate to trace beyond the international frontier those physical features which have characterized the cordillera of the Sierra Madre from the 29th to the 49th parallel. These are attractively described by Father De Smet, the well known missionary, who, in 1845, crossed the mountains from the sources of the Columbia to the Bow river, or South fork of the Saskatchawan. Thence he continued northward, noticing coal on the Red Deer, a branch of the Bow river. Descending the valley of the Red Deer, he at length emerged upon what he described as "the vast plain, the ocean of prairies." He followed the general direction of the mountain chain to Edmonton House, in latitude 54°, whence he wrote in the following terms:

"The entire region in the vicinity of the eastern chain of the Rocky mountains, serving as their base for 30 or 60 miles, is extremely fertile, abounding in forests, plains, prairies, lakes, streams, and mineral springs. The rivers and streams are innumerable, and on every side offer situations favorable for the construction of mills. The northern and southern branches of the Saskatchawan water the district I have traversed for a distance of about 300 miles. Forests of pine, cypress, thorn, poplar, and aspen trees, as well as others of different kinds, occupy a large portion of it, covering the declivities of the mountains and banks of the rivers. These originally take their rise in the highest chains, whence they issue in every direction like so many veins. The beds and sides of these rivers are pebbly, and their course rapid, but as they recede from the mountains they widen, and their currents lose something of their impetuosity. Their waters are usually very clear. The country would be capable of supporting a large population, and the soil is favorable for the production of wheat, barley, potatoes and beans, which grow here as well as in the more southern countries."

As early as 1862, some American explorers washed from the bed of the north Saskatchawan river, at a distance of 200 miles from its extreme sources in the Rocky mountains, minute particles of gold, but with no return exceeding *one cent to the pan*, or $5 per day. In subsequent years the emigrants from Selkirk settlements, and a few American adventurers, obtained more satisfactory results, there being frequent instances of $10 as a daily average from bars or gulches nearer the mountains. As the Montana explorations have advanced towards the international frontier, each encampment proving more productive than its predecessors, the opinion has prevailed that the sources of the Saskatchawan would develop rich deposits of gold and silver, especially near the great centre of physical disturbance, where Mount Hooker reaches an elevation of 16,000 feet, and Mount Brown 15,700 feet above the sea, and from which the waters of the Saskatchawan, Peace, Frazer, and Columbia rivers diverge to three oceans. So prevalent is this belief in Montana that a sudden migration of thousands may at any moment be anticipated. American prospectors at the Kootanie mines have already passed the mountains on or beyond the boundary of 49°, and found rich washings, returning even $60 daily to the hand on the sources of the south Saskatchawan.

The limit of successful agriculture in the northern temperate zone should be carried considerably beyond the Saskatchawan valley, especially near the Rocky mountains. Sir Roderick Murchison, in an address before the London Geographical Society, represents this chain of mountains to be greatly depressed in high northern latitudes, and indeed several of the tributaries of the Mackenzie have their sources on the Pacific slope, and wind through the mountains before falling into the great Arctic river. The mountain valleys of the Peace and Liard rivers, latitude 56° to 60°, are thus influenced by the Pacific winds, and wheat and other cereals are successfully cultivated. Sir Alexander Mackenzie describes, under date of May 10, the exuberant verdure of the mountain valleys—trees about to blossom, and buffalo attended by their young. During an inquiry in 1858 by the English House of Commons into the situation of the territory of the Hudson's Bay Company, similar statements were elicited. Dr. Richard King, who accompanied an expedition in search of Sir John Ross, as "surgeon and naturalist," was asked what portion of the country visited by him was valuable for the purpose of settlement. In reply he described "as a very fertile valley a square piece of country," bounded on the south by Cumberland House, and by the Athabasca lake on the north. His own words are as follows:

"The sources of the Athabasca and the sources of the Saskatchawan include an enormous area of country. It is, in fact, a vast piece of country surrounded by water. When I heard Dr. Livingstone's description of that country, which he found in the interior of Africa, within the equator, it appeared to me to be precisely the kind of country which I am now describing. It is a rich soil, interspersed with well wooded country, there being growth of every kind, and the whole vegetable kingdom alive."

When asked concerning mineral productions his reply was:

"I do not know of any other mineral except limestone; limestone is apparent in all directions. * * * The birch, the beech, and the maple are in abundance, and there is every sort of fruit."

When questioned further, as to the growth of trees, Dr. King replied by a comparison "with the magnificent trees around Kensington Park in London." He described a farm near Cumberland House, under very successful cultivation—luxuriant wheat, potatoes, barley, pigs, cows, and horses.

Beyond the Athabasca district above described, the valley of the Mackenzie, parallel and adjacent to the northwestern trend of the Rocky mountains, is too Arctic in position and climate for successful agriculture, but will always possess interest to the geologist and mineralogist. Its course has been frequently followed by scientific observers, either employed by the Hudson's Bay Company, or commissioned by the English government for

exploration of the Arctic coast. These observations are of interest, from their analogies to the formations previously noticed within the Territories of Montana, Colorado, and New Mexico, and because the extreme northern districts are only separated by a mountain chain from the comparatively unknown Territory of Alaska. The Saskatchawan basin is mostly silurian, but toward its western and northern borders coal measures are developed, which extend continuously to the Arctic ocean along the western bank of the Mackenzie. The preponderance of testimony is that the coal is lignite. Of this Mackenzie district Sir John Richardson thus spoke in a communication published in the journal of the Geographical Society for 1845:

"It is rich in minerals; inexhaustible coal-fields skirt the Rocky mountains through 12 deg. of latitude; beds of coal crop out of the surface on various parts of the Arctic coast; veins of lead ore traverse the rocks of Coronation Gulf, and the Mackenzie river flows through a well-wooded tract, skirted by metalliferous ranges of mountains, and offers no obstruction to steam navigation for upwards of 1,200 miles."

DAKOTA.

Returning to the territory of the United States, the Black Hills on the western border of Dakota, between 44° and 45° latitude, and 103° and 105° longitude, will next receive notice. They are closely connected with the Missouri and Yellowstone mines of Montana, and have been ascertained by the explorations of Lieutenant G. K. Warren in 1847, and of Captain W. F. Reynolds in 1859 and 1860, under the direction of the United States topographical office, to be rich in gold and silver, as well as coal, iron, copper, and pine forests.

The area occupied by the Black Hills, as delineated on a map which accompanied Lieutenant Warren's report, is 6,000 square miles, or about the surface of Connecticut. Their bases are elevated from 2,500 to 3,500 feet, and the highest peaks are 6,700 feet above the ocean level. The whole geological range of rocks, from the granite and metamorphosed azoic to the cretaceous formations of the surrounding plains, are developed by the upheaval of the mountain mass. Thus, at the junction of the silurian rocks, gold becomes accessible, while the carboniferous strata bring coal measures within reach.

With the pacification of the Sioux Indians and the establishment of emigrant roads, this district of Dakota would doubtless be the scene of great mining excitement, as the gold field of the Black Hills is accessible at a distance of 120 miles from the Missouri river.

MINNESOTA.

In 1865 attention was directed to discoveries of gold and silver northwest of Lake Superior, in the State of Minnesota. Lake Vermillion, an expansion of a stream of that name, is the centre of the district in question. The outline of this lake is very irregular. With a diameter of 30 miles, its surface is so studded with islands, its shores so broken with bays and headlands, that the entire coast line cannot be less than 200 miles in extent. In 1848 Dr. I. G. Norwood, of Owen's geological survey, passed from the mouth of the Missouri river, at the western extremity of Lake Superior, to the sources of Vermilion river, and, descending through the lake to the Rainy river, furnished a sketch of its natural features and mineral exposures. His statements are repeated so far as they record the usual indications of a gold formation.

Before entering Vermilion lake from the south, Dr. Norwood mentions a perpendicular fall of eight feet over "silicious slate, hard and gray, with minute grains of iron pyrites sparsely disseminated through it." This rock bears east and west, with thin seams of quartz between the laminæ, running in the line of bearing. There are also irregular patches of quartz from 8 to 10 feet long, and from 6 to 12 inches wide, which cross the strike at right angles. The river is broken by falls three-quarters of a mile above, or south of, Lake Vermillion.

The islands in the lake indicate very distinctly volcanic action, one of them being an extinct crater. The prevalent rocks are talcose slate, which Dr. Norwood describes as "eminently magnesian, thinly laminated, and traversed by numerous veins of quartz from an inch to five feet wide, some of which contain beautiful crystals of iron pyrites." He adds that, "from some indications noticed, other more valuable minerals will probably be found associated with it." A specimen obtained about midway of the lake is catalogued as "quartz of reddish brown color; crystalline, with yellow iron pyrites, crystallized as well as foliated disseminated through it."

These quartz veins were ascertained in 1865-'66 to be auriferous. A specimen weighing three pounds, containing copper pyrites, was forwarded by the governor of Minnesota to the mint in Philadelphia, and, upon assay, was found to contain $2 63 of gold and $4 42 of silver per ton of $2,000 pounds. The State geologist, Mr. H. H. Eames, reported an abundant supply of quartz equal in richness. Other assays in New York—in one instance by officers of the United States assay office—exhibited results from $10 to $35 per ton. Professor J. V. Z. Blaney, of Chicago, described a vein 10 feet in width, at the foot of a shaft of 50 feet, which was "indubitably gold-bearing," and added that "specimens taken from its central portion, as proven by assay, would be sufficient in California, Colorado, and other successful mining regions, to warrant further exploration." Washings of the drift near the veins opened have produced gold, but in limited quantities.

Difficulties of transportation, concurring with the general depression of mining interests in the basin of Lake Superior, have postponed the consummation of several enterprises for working the Vermillion mines; but a ton of quartz recently reduced at St. Paul is said to have yielded eight pounds of bullion, valued between $400 and $500. The question of their general productiveness remains to be determined.

CANADIAN MINES.

When, in 1862, gold was discovered upon the sources of the Saskatchawan, a newspaper at Selkirk settlement, the *Northwester*, published statements of the existence of gold between Lake Superior and Lake Winnipeg. Since the Vermillion discovery, rumors of its extension into British America are prevalent, and suggest a probability that the mountain chain known to geographers as the Laurentian, which separates the waters of the St. Lawrence and its lakes from the tributaries of the Hudson Bay, may reveal to future explorers extensive deposits of gold and siver. The basin of St. Lawrence, including the sandstones of Lake Superior, is a lower silurian formation; that of Hudson Bay, granitic or primary, with many evidences in Minnesota and along the Canadian shore of Lake Superior of eruptive and igneous agencies.

Sir Roderick Murchison has frequently advanced the opinion that the productive gold districts of the world occur where the silurian, and perhaps the lower strata of the Devonian, rocks are in contact with, or have been penetrated by, greenstones, porphyries, serpentine, granitic, and other rocks of the primary formation. Gold, when traced to its original matrix, is found to occur chiefly in veins or lodes of quartz rising from beneath and cutting through the secondary strata or beds of which the surface was previously composed. These conditions are observed in the Vermillion district, and Professor Owen, as early as 1850, traced in this locality of Minnesota, and northeastwardly along the north shore of Lake Superior, in Canada, what he denominated a "great plutonic chain," and the "main axis of dislocation," from which silurian sandstones extend southwardly through Wisconsin and Minnesota, while on the north the streams which are turned towards Hudson Bay traverse regions exclusively granitic or primary. If in Minnesota an auriferous belt has marked this line of junction, we may with reason anticipate its extension eastwardly into Canada and northwestwardly towards Lake Winnipeg. Indeed, as English explorers trace this contact of primary and silurian formations along the basins of Lakes Slave and Athabasca and the channel of Mackenzie to the Arctic ocean, it becomes an interesting problem for future solution whether the auriferous deposits of British Columbia and Saskatchawan may not be extended, with various degrees of productiveness, along the crest which separates the waters of the Gulfs of Mexico and St. Lawrence from those of the Arctic ocean and Hudson Bay, quite as the discoveries of this century now follow the Ural mines eastward, through Siberia, to the Pacific.

The intrusion of granite rocks is not confined in Minnesota to the northeastern angle of the State. It has been traced south westwardly, near Sauk rapids, upon the Upper Minnesota, and even to the northwestern boundary of Iowa, in a wedge-like shape, although covered in most places by the mass of drift which constitutes so large a portion of the surface of Minnesota. A similar granitic cape, with its associated minerals, may be the explanation of the alleged gold deposits in the township of Madoc, near Kingston, in Canada West.

In 1867 occurred an important discovery of native silver near Fort William, on Thunder bay of Lake Superior, almost at the western limit of Canada. Miners from Ontonagon have visited the locality and returned with specimens of native silver, lead, copper ore and mundic. The native silver is principally disseminated in the vein matrix, much like stamp copper, and its weight runs from one to ten per cent. of the rock. The lead is also highly charged with silver ore. Although many claims have been secured, yet only two shafts have been sunk. From these, which have reached a depth of thirty to forty feet, a considerable amount of ore has been taken, consisting of native silver, black sulphuret of silver, argentiferous galena, and leaf silver through the spar. These shafts are upon one lode, which is fully twenty feet in width, having an east and west bearing, with dip to the north. The sheet of mineral and metal is about four inches in thickness, interspersed through the spar and quartz mingled with hornblende. The yield of the working ores, from practical assay, is stated to be at the rate of $700 per ton. If the current information in regard to these silver mines at Fort William is confirmed, they will soon be the centre of great mining excitement.

A discovery of gold on the north shore of Lake Superior, in the region of Black bay, between Thunder bay and the river Neepigon, is communicated by Prof. E. J. Chapman to the Toronto *Globe*. He represents that repeated assays have yielded amounts of gold varying per ton from fifteen to nineteen pennyweights, the mean being seventeen pennyweights twelve grains, with about two ounces of silver—results obtained from surface specimens only, and showing a value of nearly $21 per ton, irrespective of considerable amounts of copper and lead. The enclosing rock is described as silurian.

The discoveries in the Madoc district, near Belleville, in Canada West, or Ontario, have been extended, geographically, during the past year, and reduction works by several responsible companies are nearly completed. Much mystery attends the degree of success by the different claims now in course of development, but there is good reason to believe that next summer's operations will vindicate the wisdom of the very considerable investments which have been made.

The latest and most reliable statement in regard to the Madoc mines is presented by the gold inspector of the Quinte mining district, for the month of January, 1868, from which it appears that the reduction of ores by working process from forty-five district localities, nineteen yielded gold in paying quantities, fourteen in smaller quantities, and twelve showed blank. The highest returns were $40 and $62 per ton. Of the mines from which samples have hitherto been sent to two reducing establishments, now in operation, forty-two per cent. will pay to work from the first, thirty-four per cent. are worthy of further trial, and only twenty-six per cent. show no appreciable result. The greatest depth of excavation yet reached is seventy feet.

The auriferous alluvians of Lower Canada cover an extended region estimated by the geological commission to embrace 10,000 square miles. The gravels, through which the gold is very irregularly distributed, are generally covered by a layer of vegetable earth, and often by a bed of clay. They repose in part upon metamorphic lower silurian rocks, consisting of schists, generally talcose, micaceous or chlorite, associated with diorites and serpentines. But to the southward these lower silurian strata are conformably overlaid by others of upper silurian age, which are also covered by gold-bearing alluvians. These upper rocks consist of argillaceous schists, with sandstones and limestones all more or less altered. The rocks of these two formations, but especially of the upper silurian, are traversed by numerous veins of quartz running in the direction of the stratification, or between northeast and east. Mr. A. Michel, from whom these particulers are obtained, compares these Canadian deposits with the auriferous sands of the Ural or Altai mountains, in Siberia, which are rarely found reposing on granitic or syenitic rocks, but almost always on schistose rocks in the vicinity of diorites and serpentines, which has led the Russian mining engineers to consider the gold as having "its principal source in the ferruginous quartz of the metamorphic schists, and in the vicinity of the serpentine and diorites."

These mines are called Chaudiere, as upon that tributary of the St. Lawrence and its branches, in the Seignory of Vaudreuil, the principal placers have been discovered, and there, also, the only quartz lodes have been successfully worked. Alluvial mining is no longer prosecuted, although favorable reports have been circulated since 1851, and Mr. T. Sterry Hunt, of the Canadian geological survey, claims that the river banks would richly repay the use of hydraulic methods. Assuming that the cost in Canada of washing gravel by this method would be one-fourth as much as in California, or five cents the cubic yard, he adds that the auriferous alluvian over an acre at the forks of the Du Loup and Chaudiere yielded, during the workings in 1851-'52, at the rate of one and thirty-eighth hundredths grain of gold to the cubic foot, which is equal to thirty-seven grains to the cubic yard. At the ordinary fineness of the alluvial gold of the Chaudiere region, the value of this would be $1 33 as the yield of a cubic yard of gravel. The alluvial gold of this district is not confined to the gravel of river channels, nor to alluvial flats, but is found in gravels high above the river beds, to which the hydraulic method might be applied with advantage even though the proportion of gold was much less than near the Du Loup.

Prof. Hunt gives the results of thirty-one assays of gold-bearing rock, from twelve different localities. Of these assays eighteen gave no trace of gold: while the remaining thirteen gave the following returns: 1. Of five assays four gave an average of only 6 dwts., 13 grains of gold, equal to $6 76, while the fifth, in which a large scale of gold was seen in sifting and was added to the assay, yielded at the rate of 4 ounces, 18 dwts., equal to $101 29; the average of the five assays being $25 66 per ton. 2. From another locality in the Seignory of Vaudreuil, four assays gave a mean of 4 dwts., 21 grains, equal to $5 03; and that of two others, in which a scale of gold was seen and ground up with the powder, gave 3 ounces, 2 dwts., equal to $64 07, the average of the six assays being $24 71 to the ton. 3. Two Vaudreuil assays gave a mean of 14 dwts., 16 grains, equal to $15 15. 4. Two assays from another district, Liniere, gave a mean of 6 dwts., 13 grains, equal to $6 76 to the ton.

This record does not place the success of quartz mining beyond all contingency; but a well-organized company is now engaged in experiments which will determine the question during 1868.

NOVA SCOTIA.

There is no district on this continent, not excepting the Grass Valley mines of California, where the reduction of auriferous quartz has been more successful than in Nova Scotia. Two important elements concur in this result—the cheapness of commodities under light taxation, and the great facilities of access from the sea, and by good roads.

Hon. P. S. Hamilton, commissioner of mines at Halifax, has favored me with an elaborate communication upon the gold mines of Nova Scotia, including some notice of the coal measures, which is given in the appendix. The production of gold during 1867 amounted to $517,140.

THE ALLEGHANY GOLD FIELDS.

The Appalachian chain takes its origin in Canada, southeast of the St. Lawrence, and forms a broad belt of mountain ridges extending in a southwesterly direction to Alabama. The entire length of the chain is about 1,300 miles: its breadth is variable, gradually expanding toward the centre, and contracting at each extremity. The most striking feature of this mountain system is the fact that it is made up of a series of parallel ridges, very numerous, especially in Pennsylvania and Virginia, no one of which can be considered as being the main or central chain to which the others are subordinate, but the whole forming a system of flexures which gradually open out from the southeast to the northwest, as has been made evident from the results of the geological surveys of Pennsylvania and Virginia, under the direction of Professors H. D. and W. B. Rodgers. Along the southeastern edge of this great Appalachian system is a relatively narrow, undulating range, known under different names in different States. In Vermont it is called the Green mountains; in New York, the Highlands; in Pennsylvania, the South mountains; in Virginia, the Blue Ridge; in North Carolina, the Smoky mountains. The rocks of this belt, which has a width of 10 or 15 miles, are of the lower palæozoic age, but highly metamorphosed and, for the most part, having their organic remains entirely obliterated. Still further to the southeast lies the great auriferous belt, nearly parallel with the Blue Ridge, and not easily separated from it in geological age, either lithologically or by palæontological characters. The central axis of this belt has a direction in Virginia of about north 32° east; towards the north it assumes a more nearly north and south direction, and to the south it approaches an east and west line. Its width, where most developed, does not exceed seventy miles. This is about its extent on the borders of North and South Carolina. In Virginia it does not exceed 15 miles. Starting from Georgia and proceeding northward, we find if developed in the following counties: In Georgia, in Carroll, Cobb, Cherokee, Lumpkin and Habersham counties; in South Carolina, through the whole northwestern corner of the State, especially in the following districts: Abbeville, Pickens, Spartenburg, Union, York, Lancaster; in North Carolina, in Mecklenburg, Rutherford, Cabarrus, Rowan, Davidson, Guilford and Rockingham; thence through Virginia, in Pittsylvania, Campbell, Buckingham, Fluvanna, Louisa, Spottsylvania, Orange, Culpepper, Fauquier; in Maryland, Montgomery county. Beyond Maryland, to the north, the indications become fainter, and consist only in a few scattered lumps or fine scales occasionally picked up, until we reach Canada, where there is a considerable extent proved to be auriferous.

Throughout this whole extent the auriferous belt presents rocks of nearly the same character. The predominating kind of slate is talcose, passing into chloritic and argillaceous. The prevailing dip is to the east at a very high angle. In Virginia they stand nearly vertical.*

Since the California discovery of 1848 little attention has been given to alluvial mining in Virginia, the Carolinas and Georgia, and until recently, capitalists have acquiesced in the opinion so confidently expressed by Sir Roderick Murchison, in "Siluria" and other publications, that, notwithstanding numerous filaments and traces of gold near their surface, the Alleghany vein-stones held no body of ore downwards which would warrant deep quartz mining. At present, with 20 years' experience in gold mining, with the testimony of miners in Colorado, that a lode apparently closed by cap-rock can be recovered with increased richness at a lower depth; with other analogies, however imperfect, from the successful treatment of pyritous ores in Nova Scotia; and with the earnest application of inventive minds to new and improved processes of desulphurization, it is evident that the working of the southern mines will be resumed, perhaps with the encouragement of a scientific survey under the auspices of the general government.

The deposits of gold at the United States mint and its branches between 1804 and 1866, from the States traversed by the Appalachian gold-field, are reported as follows:

Virginia	$1.570,182 82
North Carolina	9,278,627 67
South Carolina	1,353,663 98
Georgia	6,971,681 50
Alabama	201,734 83
	$19,375,890 80

If we admit that an equal quantity passed into manufactures or foreign commerce without deposit for coinage, the aggregate production would be about $40,000,000, of which fully three-fourths, or $30,000,000, was mined between 1828 and 1848.

It might be expected that during the year ending June 30, 1867, the productions of the southern mines would reach results as considerable as at any former period. The United States mint and branches report the deposits of that fiscal year from the Alleghany States as follows:

Alabama	$437 30
Georgia	28,758 20
South Carolina	1,200 54
North Carolina	66,305 62
Virginia	10,205 90
	$106,907 56

It was my purpose to give in detail the organizations for gold mining in the south Atlantic States, with practical results, but so far the attention of parties interested has been so exclusively occupied in acquiring titles and preparing for actual operations, that it seems inexpedient at this time to attempt such a detailed statement. Referring, therefore, to my preliminary report for a review of the geological and mineralogical features of the region in question, I repeat the following general observations:

1. There is yet much room for the vigorous and intelligent prosecution of alluvial mining; especially in Georgia, where the country is abrupt and nature has subjected the auriferous rocks to much dislocation and atmospheric exposure, not only the beds of the rivers, but the adjacent detritus of their valleys, will unquestionably give large returns to the new and powerful methods for washing ponderous masses of earth. It is understood that companies are now organized who propose to introduce these hydraulic appliances upon the Chestatee and other tributaries of the Chattahoochee river.

2. There is abundance evidence, also, that the upper portions of auriferous lodes, have been in a remarkable degree desulphurized, and may be worked to a considerable depth with great advantage before the intrusion of what is called "cap" in Colorado, or before the main body of the vein becomes obstinately pyritiferous. Surface quartz mining, if the phrase is admissible,

* Whitney's Metallic Wealth of the United States.

will warrant considerable investments whatever subsequent experience shall demonstrate in regard to the refractory sulphurets. It may be admitted that hitherto a quartz so modified in chemical constitution as to be honey-combed, having become cellular and brittle from the decomposition of pyrites, with the gold set free from its matrix, is the only material which it is profitable to reduce. But the testimony is ample that immense quantities of ore in this favorable situation are accessible in the Alleghany gold district.

3. There are no grounds for the opinion that the auriferous lodes, strongly marked as they are by native sulphurets, will not prove true fissure veins, improving in quantity and quality with their depth. Professor Frederick Overman, in a work entitled "Practical Mineralogy," published in 1851, claims that the pyritous veins of Virginia and other south Atlantic States will be more sure and lasting than the gold-bearing localities of California. If the lower beds of Colorado mines can be raised and reduced with profit, deep sinking will be equally successful in the Carolinas.

METALLURGICAL TREATMENT.

The process of amalgamation still generally prevails in the mining districts enumerated. It consists in reducing auriferous rock to a fine powder by means of stamps, arastras, Chilian mills, or other mechanical contrivance, and subjecting it to a continuous agitation with mercury, with water enough to give a pasty consistency to the mass, the object being to expose as fully as possible the fine particles of gold and silver to the attractive power of the mercury, with which they form an *amalgam* easily separated by subsidence in the lighter pulp of earthy matter of which the ore consists. The amalgam thus obtained on being subjected to moderate heat in an iron retort gives up its mercury, which passes over the vapor and is condensed again in another vessel, the metal being left in the retort.

In the case of pyritic ores, however, it is found that the process of amalgamation is seriously retarded by the impurities with which the gold and silver are associated. Probably the ores of Colorado do not yield by simple amalgamation an average of 20 per cent. of their assay value. A previous process of desulphurization is therefore indispensable, and how best to accomplish this is the problem which has occupied the attention of metallurgists for many years. Many methods have been advised, the majority of which being merely empirical have had but an ephemeral reputation.

The opinion is widely prevalent that smelting—the attack of gold or silver bearing ores by fire—will be the final and indispensable expedient of separating the precious metals from its matrix. If smelting works on a large scale could be established in all the mining Territories, there would doubtless ensue a subdivision of labor in the business of mining gold and silver, as is now the case in iron mining. The miner would limit his efforts to raising ore from the mine, and the smelting furnace would afford a market where the ore might command its price, which would be better for all parties than the method hitherto pursued, of raising and reducing ores under one administration.

But at present there are two great obstacles to such a development of mining in the Rocky mountain districts, and perhaps elsewhere: excessive prices of machinery, chemicals, and utensils, resulting in a great degree from the high rates of taxation, external and internal; and the cost of transportation west of the Missouri river. The former is of universal application; the latter has special reference to the interior districts of New Mexico, Colorado, and Montana, as well as other western Territories. Except for these causes of obstruction the gold and silver product of the United States could be readily doubled. They will be considered with some fulness of illustration.

TAXATION.

It will be instructive in this connection to compare the taxation of Victoria, the leading province of Australia, and the United States, premising that 10 per cent. in addition should be added to the Victoria rates, to express the difference of freights, interest, and insurance, over the shorter communication between Europe and the United States. Tables have been compiled from the American tariff of 1867, and the latest revision of the Victoria tariff, and are presented in the appendix No. V. The tariff of Victoria has recently been advanced beyond the average of the Australian colonies.

The taxation of Nova Scotia has not hitherto exceeded an average on the dutiable list of 10 per cent., although as an incident of confederation with Canada, it has been recently raised to 20 per cent.

Far the largest portion of the importations in Victoria are charged with a duty of five per centum, while the average duties on the whole bulk of imports, under the tariff of the United States, has been computed by the special commissioner of revenue at 42.71 per cent.

In all the gold districts of the world, the opportunities of placer mining induce a high price of labor; and hence the great necessity that government shall impose the lowest rates of taxation, consistent with its necessities, upon machinery and other materials and utensils, which experience has proved indispensable to the exploration of mines. At present the burden inseparable from an ill-adjusted revenue system is a grave obstacle to the increase of our supply of the precious metals.

TRANSPORTATION.

A ton of ore in California producing $10 is remunerative of capital and labor employed; and in Canada, Nova Scotia, and the Southern States it is profitable to reduce auriferous or argentiferous rock where the average yield is $8 per ton. Yet, in the mining Territories of the Rocky mountains, on account mainly of the cost of transportation, a lode must yield $25 average per ton to warrant its occupation and improvement.

Some statements from the official records of the quartermasters' bureau of the War Department will illustrate the oppressive freights now imposed on the people of that remote interior by the necessity of wagon transportation. In 1865 the cost of transportation of a pound of corn, hay, clothing, subsistence, lumber, or any other necessary, from Fort Leavenworth to—

	Cents.
Fort Riley was	2.46
Fort Union, the depot for New Mexico	14.35
Santa Fé, New Mexico	16.85
Fort Kearney	6.44
Fort Laramie	14.10
Denver City, Colorado	15.43
Salt Lake City, Utah	27.84

The cost of a bushel of corn purchased at Fort Leavenworth and delivered at each of these points was as follows:

Fort Riley	$2 79
Fort Union	9 44
Santa Fé	10 84
Port Kearney	9 03
Fort Laramie	10 05
Denver City	10 05
Great Salt Lake City	17 00

To the last point none was sent.

During the fiscal year ending June 30, 1863, the Quartermaster General estimated the cost of transportation of military stores westward across the plains as follows:

1. Northern and western route:		
To Utah and posts on that route		$1,524,119 00
1. Southwestern route:		
To Fort Union, New Mexico, and ports on that route	$1,301,400	
To post in the interior of New Mexico	138,178	
		1,439,578 00

Cost of transportation of grain on above routes, where the grain was delivered by contractors, and the the transportation entered into the price paid the same year:

1. Utah route	$2,526,727 68	
2. New Mexico route	697,101 69	
		3,223,829 37
Cost of transportation of military stores across the plains same year by government trains:		
1. Utah route	$34,600 00	
2. New Mexico route	166,730 00	
		201,330 00
Total by contract and government trains		6,588,856 37

Under date of April 18, 1866, General M. C. Meigs, Quartermaster General, furnished the following unofficial statement:

"The distances to the north-west are great; the interior and local transportation as costly. The use of the Missouri river, however, will enable the government to place a large part of its supplies upon the upper waters of that river, by taking advantage of the summer rise, and thus the extent of land transportation will be reduced; but, until the Missouri valley itself is settled, the navigation will continue to be slow and perilous. Steamers are now obliged to stop from day to day to cut green cottonwood or driftwood upon the banks, and a trip to the upper Missouri is a season's work. Many boats are wrecked; some are caught by the falling waters and compelled to winter on the upper river. Insurance to Fort Benton, the head of navigation, costs 20 per cent.; and the government has this year been obliged to engage freight from St. Louis to Forts Berthold and Union, old trading posts now about to be occupied by troops as military posts, at $5 per 100 pounds, or $100 per ton. Fort Union is, in a direct line, 330 miles below Fort Benton; by the river the distance is probably one-half greater. From Fort Union the supply of the troops and posts throughout Montana, and districts supplied from the east will be by wagon trains. On the well-travelled and well-guarded routes of the central and southwestern overland trails the cost of this transportation by contract last year averaged 45 cents per ton per mile. The contracts for the present year are at much lower rates, but in the remote districts of the northwest such favorable rates cannot be expected as yet. The distance from St. Louis to Fort Benton by river is estimated at 3,450 miles by river men. The cost of transportation of freight to that point is $350 to $400 per ton. From St. Louis to Helena, a town of 4,000 inhabitants, which has sprung into being in Montana within the past year, the estimated cost of transportation of freight by the river and wagon trail is $500 to $600 per ton."

Within the last two years the construction of the Union Pacific railroad has contributed to the reduction of the aggregates paid for freight, although the wagon rates are not materially diminished. In 1866 the rates from the Missouri river to northern Colorado, Nebraska, Dakota, Idaho, and Utah were $1 45; to southern Colorado, Kansas, and New Mexico, $1 38, with an addition from Fort Union, in New Mexico, to posts in that Territory, in Arizona, and western Texas, of $1 79 per 100 pounds per 100 miles. The total number of pounds transported was 81,489,321, or 40,774,10 tons, at a cost of $3,314,595.

A prominent citizen of Montana authorizes the following statements of the amount paid annually by the government of the United States and by the people of Montana for transportation. During 1865 there were 40 arrivals of steamers by the Missouri river, averaging 150 tons of freight, an aggregate of 6,000 tons. An equal quantity was delivered by wagons from the west and south. He estimates that the average charges for freight and insurance were 25 cents per pound, which, on 12,000 tons, would be not less than $6,000,000. If the population of Montana is 30,000, this would be $200 per capita; if the population is 60,000, as sometimes claimed, $100 per capita. A merchant is deprived for seven months of the year of the use of his capital—a very considerable loss of interest. In addition, the unavoidable expenses of travel, incident to the business of the country, is an immense tax. A trip to the eastern cities, or to the Pacific coast, requires a direct expenditure of $1,000. It is estimated that 20 such journeys weekly are already incident to the intercourse of the people with the business centres of the country; and if so, another million must be added to the account of transportation expenses. The wonder is, notwithstanding the richness and productiveness of the Montana mines, that such a burden can be borne, while the effect upon prices can be readily conceived.

This statement of the amounts paid for transportation in Montana will not seem improbable when it is remembered that $13,000,000 in gold was paid in 1863 for transportation eastward from San Francisco to the State of Nevada and Territories east of the Sierra Nevada.

The progress of population under these oppressive conditions in the mining States and Territories of the west, gives an assurance that the construction of an adequate railway system from the Mississippi river to the Pacific coast would be attended with such an extension of settlements as would justify the immediate reduction of rates of transportation to one-third of those now prevailing. A large saving to the government upon its unavoidable movement of men and supplies would also follow.

When in 1853 the initiative of Pacific railroad exploration was presented to the United States Senate, resulting in a congressional appropriation of $150,000 for the purpose, attention was directed to three routes—the northern, the central, and the southern. Legislation has followed in behalf of one, the central, not so much from any demonstration of greater feasibility, but because the mineral discoveries of the interior, followed by population, suggested the selection. The same causes are now active on the two other routes. Discoveries, not only of gold and silver, but of coal, iron, lead, and salt, diversifies the map of the Rocky Mountain region everywhere within our boundaries; and all emigration from the Pacific coast meets the Atlantic column even upon the great plains which are drained by the Missouri, the Platte, and the Rio Grande.

The necessity of more than one route between the Mississippi States and the Pacific coast will appear from an enumeration of the railroad lines which are indispensable to the commerce between the Atlantic and interior States. These are seven well-defined thoroughfares: 1. From Portland, by the Grand Trunk to Detroit, and thence with a traverse of the State and lake of Michigan to Milwaukee and La Crosse. 2. By the New York Central, the Great Western, of Canada, and the Chicago and Northwestern railroad, to Prairie du Chien. 3. By the New York and Erie, the lines of Ohio and Indiana south of the great lakes, and the Illinois Central to Galena. 4. The Pennsylvania Central and its western connections to Rock Island. 5. The Baltimore and Ohio, by way of Cincinnati to St. Louis. 6. From Richmond, through the Cumberland valley to Memphis. 7. From Charleston and Savannah, traversing the States of Georgia, Alabama, and Mississippi, to Vicksburg and New Orleans. All these highways are thronged and prosperous, and, with the wonderful impulse to colonization and commerce induced by mining investments, the period seems to have arrived when a wise statesmanship is fully justified in proposing a westward extension of continental communications upon the following lines':

First. Through the southern tier of States, on or near the parallel of 35 deg., which is central to the region of cotton, the sugar cane, and the vine, and which will be supported by the populations of Louisiana, Arkansas, Neosho, (or the territory occupied by the Cherokee and Choctaw Indians,) Texas, New Mexico, Arizona, Sonora, and southern California. This may be called the gulf route from its relations to the gulfs of Mexico and California.

Second. The central, which is now in course of construction on the average latitude of 40 deg., with its present prestige and aid from the federal government; the speedy construction of this road may be anticipated in 1870. If in operation at the present moment the road would be financially successful. All the resources of Kansas, Nebraska, Colorado, Utah, Nevada, and, in a great degree, of Missouri and California, are pledged to such a result.

Third. The lake route, hitherto designated in congressional debates as the northern Pacific route, connecting the western coast of the great lakes and the navigable channel of the Columbia river by the most direct and feasible communication with which the Territories and future States of Dakota, Montana, Idaho, and Washington, as well as the States of Minnesota and Oregon, are identified.

A few illustrations will be given of the possibilities of State aid in behalf of such improvements without involving permanent financial burdens.

When, ten years ago, India was exhausted, by a mutiny of the native population, and its suppression after a desperate struggle, a railway system, penetrating the whole of the peninsula of Hindostan, was deemed essential to its military occupation, and the government of India offered a guarantee of five per cent. on the stock required to construct and equip not less than 5,000 miles of railroad. The total amount of capital raised under this guarantee to April 1, 1867, was £67,244,802; but of this amount the government liability has already ceased upon £42,584,649, the roads constructed with that sum not only paying dividends of five per cent. to the stockholders, but a surplus for reimbursement of previous advances by government. Four thousand miles of railroad have thus been assured to India, and so wisely are the securities adjusted that this immense boon to the people will not be attended by permanent burdens to the finances of the province. With the aid of these communications India hopes to rival the United States in the production of cotton.

The province of Victoria, in Australia, has incurred a debt of £10,000,000 in the construction of railways, from which the total gross revenues in the year 1865 amounted to £717,162, almost sufficient, after the deduction of current expenses, to discharge an interest of six per centum on their cost of construction. The reduction of the rates of transportation from Melbourne to the gold districts of Ballarat and Bendigo, is far greater than we have ventured to anticipate from the construction of railroads through the western Territories of the United States.

In Belgium the State is a great railway proprietor, and the State railway is the largest source of national revenue. It was the first work of the kind ever undertaken by a government, or on so grand a scale by any proprietary. The act by which it was decreed passed in 1834, and in 1835 the line was open from Brussels to Malines. In 1844 the entire length—560 kilometres—was completed. It produced to the State a gross revenue in 1863 of 31,750,000 francs, or £640,000. Other lines have been leased by the State, and there are altogether open 1,906 kilometres, equal to 1,191 English miles; of which 748 kilometres, or 467 English miles, are in the hands of the State, and the residue worked by companies. It is calculated that in the year 1864 the net revenue will amount to 24,000,000 francs, or £960,000 per annum, or enough to pay the then reduced (through the sinking fund) interest of the national debt. As each conceded railway lapses gratuitously to the State in ninety years from the period of its construction, the entire system will, by the efflux of time, become national property.

The growth of the railway system of France dates from the year 1840, previous to which there were but few lines in France. For a time the idea was entertained of making all the railways which were to be built State property, but in the end it was determined and settled by the law of June 11, 1842—modified in 1858, 1859 and 1863—that the work should be left to private companies, superintended, however, and, if necessary, assisted in their operations by the State. The French railways at present are almost entirely (the exception being to the amount of less than 200 miles) in the hands of six great companies. The length of lines held by each of these companies on January 1, 1867, was as follows: Paris, Lyons, and Mediterranean, 1,994½ miles; Eastern of France, 1,559½ miles; Orleans 1,829½ miles; Western of France, 1,051½ miles; Northern of France, 728½ miles, and Southern of France, 827½ miles. The six great systems combined had thus, in 1867, an aggregate of 7,989½ miles in operation. The conventions agreed on between the government and the railway companies in the years 1858, 1859, and 1864 were carried into effect on January 1, 1865. By these conventions the government guarantees four per cent. interest and 65c. for a sinking fund; altogether 4f. 65c. per cent. on the capital expended in the construction of a certain number of lines classed under the collective title of new work, *(nouveau reseau.)* The sum to be expended by the six great companies was estimated at 7,100,000,000 francs, and the works executed and grants made by the government at 1,640,000,000 francs, being in round numbers about nine milliards of francs, of which there remain only about 2,500,000 francs to be expended. It is expected that in the course of about half a century the companies will be able to divide their surplus receipts with the government, while at the expiration of the 99 years' leases granted to the railway companies, the railways will become the property of the State, which will gratuitously receive the total amount of the receipts, which, if estimated at only from 350,000,000 to 400,000,000 francs, will pay the full amount of the interest on the national debt.

Of the Prussian railways six lines (the most important that from Frankfort-on-the-Odor to Konigsburg and the Russian frontier, 101 German miles long,) are State property; seven others are under government control, having been partly constructed by State loans or subventions; and the rest (about two-thirds of the whole,) in the hands of private companies. The State railways form an important source of public revenue. In the financial estimates for the year 1865 the general receipts of the State railways was stated at 14,197,000 thalers, and the expenditure at 7,386,300 thalers, showing a surplus of 6,360,700 thalers, of which latter the sum of 467,700 thalers was derived from the lower Silesian railway, 4,000 thalers from the Berlin junction, 566,600 thalers from the Eastern, 294,500 thalers from the Westphalian, and 256,700 thalers from the Saarbruck. From the above surplus of 6,360,700 thalers the sum of 4,889,257 thalers was deducted to pay off loans and debts contracted for railway purposes, leaving a net balance of 1,471,443 thalers toward defraying the general expenses of the State.

The total length of railways in the former kingdom of Hanover amounted to 550 English miles in 1863. The gross receipts of the same in the year ending July 1, 1863, was £837,085, and the net revenue, £419,754. The whole of these lines are State property.

The public debt of Wurtemburg has more than doubled within the last twenty years, owing to the establishment of the railway lines of the kingdom, the whole of which, without exception, are State property. According to an official return, published June 30, 1860, there had been expended at that period, both for railways and steamers, a sum of 42,724,956 florins, or £3,568,746. As the capital was borrowed at from 3½ to 4½ per cent., and the net incomes of the railways, all expenses deducted, and making allowance for wear and tear, amounted to between six and seven per cent., the investments so made contributed considerably towards lightening the burdens of the tax-payers. The length of the lines given to the traffic amounted on October 15, 1861, to 266 English miles; but this did not complete the whole network of railways which is expected to be finished by the end of 1867.

All the railways of Baden are property of the State, giving a dividend on the capital expended of above six per cent. The accounts of the income and expenditure of the State railways, as well as the post-office and steam navigation on the Lake of Constance, are not entered in the general budget, but form a special fund.

Further illustrations of the railroad policy of Spain, Austria and Russia might be adduced, showing the advantages of a comprehensive and well-guarded system, by which the credit of the State is in the first instance made available for the exigiencies of construction, and, with the great resulting benefits to the people, soon becomes capitalized to the relief of the public treasury. There is no finer opportunity for an enlightened statesmanship than to utilize these European precedents in the interest of a national system of railways west of the Missouri river, but the province of this report will hardly admit of more than a bare suggestion, waiving advocacy or details.*

TREASURE PRODUCT OF THE WORLD.

The year 1848, or the epoch of the gold discovery in California, may be selected for a general statement of the amount of precious metals available for the uses of currency and the arts. M. Chevalier estimates the amount as $8,500,000,000, of which one-third was gold. An eminent English authority, Mr. M. W. Newmarch, states that the probable quantity held in Europe and America at that date to be $6,800,000,000, with a similar proportion of silver to gold. The difference between these estimates, or $1,700,000,000, may be accepted as a moderate statement of the quantities of gold and silver in those countries of Asia and elsewhere which have not been closely related to European and American commerce.

Since 1848 the average production of the world has amounted to $200,000,000, but the proportions of gold and silver have been reversed; fully two-thirds of the aggregate being gold. The treasure product of 1867 is slightly increased above this average, and may be briefly stated as follows:

	Gold.	Silver.	Total.
United States	$60,000,000	$15,000,000	$75,000,000
Mexico and South America	5,000,000	35,000,000	40,000,000

* The statistics of European railways are compiled from a London publication, "The Statesman's Year Book for 1868," by Frederick Martin.

Australia	60,000,000	1,000,000	61,000,000
British America	5,000,000	500,000	5,500,000
Russia	15,000,000	1,500,000	16,500,000
Elsewhere	25,000,000	2,000,000	27,000,000
Total	170,000,000	55,000,000	225,000,000

A brief analysis of the reasons for this estimate will be given. The commissioner upon the mineral statistics of the Pacific slope has presented, in his general communication to the department, sufficient details of the treasure product of the United States, and the causes of its decline in comparison with former years.

Continued on page 42.

MARKET REVIEW.

FRIDAY EVENING, July 17, 1868.

Gold and Silver Stocks.—The weakening effects of the hot weather extended even to mining stocks during the past week, many of which are now quoted at figures considerably lower than formerly. Nevada seems to have suffered the most, and Colorado the least; indeed, many Colorado stocks show an advance in price. The depression that now exists with Nevada cannot continue long, and many knowing ones, realizing this fact, are purchasing at the present very low figures in anticipation of the rise. Quotations range:

	Bid.	Asked.		Bid.	Asked.
Alameda Silver	— —	— 90	Kipp & Buell Gold	— —	— 10
American Flag	— 40	— 60	Keystone Silver	— 1	— 2
Atlantic and Pacific	— —	— 80	La Crosse Gold	— 36	40
Bates & Baxter Gold	— —	— 75	Liberty Gold	— —	— 4
Benton Gold	— 25	— 45	Liebig	— —	— 4
Black Hawk G	6 50	— —	Manhattan Silver	— —	140 00
Bobtail Gold	1 00	1 30	Midas Silver	— 60	— —
Bullion Consolidated	— 60	— —	Montana Gold	— 39	— 50
Burroughs G	— 9	— —	New York	— 70	80
Columbian G. & S.	— 4	— 16	New York & Eld'o	— —	1 75
Combination Silver	5 00	15 00	Nyse Gold	— 2	— 3
Consolidated Gregory	4 65	4 85	Oxyoke Mining	— —	30 00
Corycon Gold	— —	— 45	Con. Colorado	10	— —
Edgehill Mining	— —	4 50	People's G. & S. of Cal	— 5	— 15
Empire G	— —	3 00	Quartz Hill	1 05	1 15
Gold Hill	— —	1 00	Reynolds Gold	— —	— 2
Grass Valley	— 20	— 35	Rocky Mountain Gold	— 11	— 14
Gunnell Gold	— 80	1 20	Smith& Parmelee Gold	3 75	3 80
Gunnell Union	— —	— 30	Sensenderfer	— —	10 00
H'n G & S. bs	— —	— 55	Symonds Fork Gold	— —	1 00
Harmon G. & S. bs	— —	3 00	Texas Gold	— —	— 10
Holman	— 4	— 10	Twin Riv Sil	20 00	30 00
Hope Gold	— —	— 20	Vanderburg G	— —	— 70

Copper Stocks.—Save that Rockland is stronger, there is no change to be recorded this week.

Caledonia C	— —	5 00	Gardiner Hill	— —	1 00
Canada	— —	— 50	Hancock C	— —	5 00
Charter Oak	— —	1 00	Hilton	— 50	1 00
Copper Falls	22 00	— —	Isle Royale	— —	4 00
Davidson	— —	— 65	Knowlton	— —	2 00
Evergreen B	— —	10 00	Minnesota	— —	4 00
Franklin C	14 50	— —	Ogima	4 00	6 00
French Creek	— 10	— 15	Rockland	— —	4 00

Petroleum Stocks.—The market is stronger, and advanced prices are thus quoted to-day:

	Bid.	Ask'd.		Bid.	Askd.
Bennehoff Run	50	1 00	N. Y. and Alleghany		2 25
Brevoort		65	Pit Hole Creek	50	1 00
Buchanan Farm	54	56	Rynd Farm	17	20
Central	35	70	Second National		15
Clinton Oil	1 10	2 50	Sherman & B	60	
Empire & Pithole		10	Tarr Farm	30	40
Home	50		United Pet. Farms	5	15
Manhattan			Union	5 00	6 50
National			United States	1 95	2 00

Miscellaneous Stocks.—Walkill Lead, 14@16; Tudor Lead, 2 40; Rutland Marble, 15 50; Brunswick C. L., 9 90; West. U. Tel., 35¼@35½; Quicksilver, 21½; Pacific Mail, 101¼; Adams' Express, 51½@52; Merchants' Union, 23¼@23¾; American, 44¼; N. Y. Central, 132½; Erie, 68¾; B. H. & Erie, 17; Michigan S. & N. I., 92¼; Reading, 95½; Ill. Cen., 149; Cle. & Pitts., 86⅝; C. & N. W., 79½; C. C. & In., 90; Ch. & N. W. pref., 81½; Cle. P. & Ask. T. 99¾; C. & R. I., 108½; Mil. & St. P., 69½; Mil. & St. Pl. pref., 82; Tol. Wab. & W., 48¼; C. B. & Q. R., 164; M. & Pdu C. 1st pref., 106; Ft. W. & C., 103⅛@109.

Government Stocks.—Governments are excited and firm. The advance in gold, with a firmer market at London, has caused a rise throughout the list.

U. S. 6s, 1881, coupon ..... 114⅛@114¼
U. S. 5-20s, 1862, coupon ..... 114 @114¼
U. S. 5-20s, 1864, coupon ..... 110⅞@111⅛
U. S. 5-20s, 1865, coupon ..... 112 @112⅛
U. S. 5-20s, 1867, coupon ..... 109⅜@109½
U. S. 5-20s, July, 1868, coupon ..... 109⅜@109⅝
U. S. 10-40s, coupon ..... 108¼@108⅝
U. S. 7-30s, July, large ..... 109⅛@109¼

Foreign Exchange is active. There is a good demand from importers, and bankers also are remitting somewhat freely. Rates continue firm on the basis of 110¼@110¾ for prime 60 days' bankers' sterling. We quote:

London, (prime bankers') 60 days' ..... 110⅝@110¾
London, (prime bankers') sight ..... 110⅞@110¾
London, prime commercial ..... 109½@110
Paris, (bankers') long ..... 5.13⅛@5.12½
Paris, (bankers') short ..... 5.10⅛@5.10
Antwerp ..... 5.16¼@5.15
Swiss ..... 5.16¼@5.15
Hamburg (bankers') ..... 36⅛@36¼
Amsterdam (bankers') ..... 41⅛@41⅜
t (bankers') ..... 41 @41¼
Bremen (bankers) ..... 79⅝@80
Berlin (bankers) ..... 71⅞@72

Gold is quoted at 142⅝@143¼.

American silver sells at 6¼@7 cents below the price of gold, and Mexican dollars at 103½@104 in gold.

Money is in fair demand from the street, the rate on call loans being 4@5 per cent. The banks are remitting less to the interior than last week, but are holding themselves prepared for a demand from the West at an early day.

Discounts are fairly active on the basis of 6@7 per cent. for prime paper.

The following will show the exports of specie from the port of New York, for the week ending July 11, 1868, and for the season to that date:

Total for the week	$3,947,891
Previously omitted	126,462
Previously reported	51,350 825
Total since January 1, 1868	$55 425,178
Same time in 1867	31 213,668

Copper—During the past week there has been a steady demand for consumption and speculation. The sales have been about two million pounds, at 21@29¼c for Detroit, 23¼@23¾c. for Baltimore, and 24c. for Portage Lake. The sales were partly for future delivery. There is but little copper for immediate delivery offered. In London the price declined to £72 for Chili, but advanced again to £74.

Tin is dull at 23½c. for Straits; 24c. for English, and 27¼c. for Banca.

Lead.—Six hundred tons sold at 6¼@6⅝c. for ordinary Spanish.

Spelter is steady at 6 45-100 gold for Silesian.

Petroleum—Is firm at 17c.@17½c. for crude, and 34¼c @34½c. for refined, in bond.

Receipts for the week	pkgs.	19 261
Exports for the week	gals.	1,0 7 375
Do. from January 1	do.	21,848,755
Do. same time last year	do.	16 181,806

The following is the quantity exported from other ports, Jan. 1 to July 11:

		1868.	1867.
From Boston	galls.	1,265 896	1,095,154
Philadelphia		16,360 925	12,546,978
Baltimore		1,049 546	1,073,723
Portland		214,508	
Total		18,890,375	14 765,853
Total exports from the United States		44 398,531	30,722 217
Same time in 1866			27,899,521
Same time in 1865			6,205,065

THE IRON TRADE.

NEW YORK, Friday evening, July 17, 1868.

There has been an increased demand for American pig iron, and prices tend upward. Sales have been made of from five to six hundred tons Allentown at $40; 500 tons 2 ex-Poughkeepsie, and 100 tons 2 Musconnetcong, on private terms.

The present strike among the coal men of Pennsylvania is interfering with the Lehigh furnaces, and the furnaces are not at present offering any iron.

Scotch iron is quiet. Sales 200 tons Glengarnock at $42 from yard; 500 tons at $41 for Glengarnock ex-ship, and $42 for Gartsherrie.

Of scrap iron some 2,000 tons have been sold during the last two weeks for future shipments on p. t.; 150 tons scrap, ex-ship, p. t.

Old rails are in demand and scarce; 200 tons old T-rails at $49 cash.

BOSTON, July 15, 1868.

There is a firm feeling for pig iron, with a steady demand. Sales of Scotch, Gartsherrie and other brands No. 1 at $42@44 per ton; and American at $40@45 per ton, as to quality. Bar iron remains the same, with steady sales; and Russia sheet iron has been selling at 13@14c. per lb., gold.

Imports of pig iron from January 1, to July 11,

	1868.	1867.
For Great Britain	5,295	17.697
Coastwise	5,680	4,169

PHILADELPHIA, July 15, 1868.

In pig iron there is very little doing; sales of anthracite at $37@38 for No. 1; $35@36 for No. 2, and 32@33 per ton for hard. Manufactured iron is firmly held at full prices.

Lehigh Valley Iron Trade.

The following table shows the amount of Pig Iron transported over the Lehigh Valley Railroad for the week ending July 11, 1868, and for the season to that date.

From	July 4, 1868. Tons.	Total.
Carbon Iron Co	60	4,835
Lehigh Valley Iron Co	180	6,290
Thomas Iron Co	350	15,665
Lehigh Crane Iron Co	410	12,375
Allentown Iron Co	480	10,180
Robert Iron Co	45	5,340
Glendon Iron Co	720	13,900
Other shippers	925	11,277
Total	3,170	81,562

Lake Superior Iron Trade.

Receipts of Ore and Pig Iron at Marquette, up to and including Saturday, July 4, 1868, by the Marquette & Ontonagon Railroad.

IRON ORE.

	Previously reported.	For week end'g June 20.	Total.
Lake Superior Iron Co	27,448	4,313	31,761
Cleveland Iron Co	12,253	1,074	13,327
Marquette Iron Co	3,490	491	3,981
Washington Iron Co	9 547	1,763	11.310
New England Iron Co	3,011	....	3.011
Edwards Mine	4.430	201	4 631
Pittsburg & Lake A. Iron Co	8.192	807	8 999
Ore to Local Furnaces	8,361	1,045	9,406
Total Iron Ore, tons	76,732	9,694	86,426

PIG IRON.

Morgan Iron Co	3,193	471	3,664
Greenwood Iron Co	328	....	328
Bancroft Iron Co	1 648	67	1,715
Collins Iron Co	1.247	123	1,370
Michigan Iron Co	2,374	106	2,480
Total Pig Iron, tons	8,790	767	9,557
Total Ore and Pig Iron, tons	85,522	10,461	95,983

Market Prices.

NEW YORK, July 17, 1868.

IRON.—Bars, 1 to 1¼c. per lb.; railroad, 60c. per 100 lbs.; boiler and plate, 1¼c. per lb.; sheet, band, hoop and scroll, 1¼ to 1¾c. per lb.; pig, $9 per ton; polished sheet, 3c. per lb. Payable in gold.

Anthracite, No. 1, bess.	$38 00	@40 00	Refined, " "	90 00	95 00
" " 2x, fdry	34 00	38 00	Old Railroad Iron	49 00	@
" Grey Forge,	32 00	34 00	STORE PRICES.		
Scotch Pig, No. 1	41 00	44 00	Bar, Swedes, ord'y sizes	— —	150 00
White and Mottled	31 00	31 50	Bar, Eng. and Am., r'd	95 00	100 00
Charcoal, cash	45 00	65 00	Bar, Eng. & Am., com.	85 00	90 00
Old Wrought sc'p, fm yd.	47 50	— —	Sceoll	125 00	170 00
" " " fm. vsl.	46 00	— —	Ovals and half round	120 00	@150 00
R.R. Iron, For., fm Stock gold	51 50	52 50	Band	125 00	— —
R R Iron, For., to imp.	50 50	— —	Horse Shoe	125 00	— —
" " Amer, at wks. currency	76 00	— —	Rods, ⅜@3-16 inch	100 00	160 00
R.R. Iron, Am., deliv'd.	80 00	— —	Hoop	133 00	185 00
Solid Steel rls. For, gd.	110 00	— —	Nail Rod, per lb	9	10
American Bar Iron. Common, per ton	80 00	85 00	Sheet, Rus., Med. Nos.	18¼	19½
			Sheet, s'gle, D. & T. com	5	7
			Rails, Eng., gold, ton	51 50	52 00
			Rails, American	79 00	80 00

STEEL.

English, cast (2d and 1st quality) per lb	18 @23
English Spring (2d and 1st quality)	10 @12¼
English Blister (2d and 1st quality)	11½ 20
English Machinery	13½ 16
English German (2d and 1st quality)	14 16
American Blister, "Black Diamond,"	10 16
American, Cast, Tool " "	19 —
American, Spring " "	10 13
American, Machinery " "	— 13
American German " "	10 13

LONDON, June 26, 1868.

IRON.—In Staffordshire, says the *Mining Journal*, a steady demand continues, and as the railway companies are gradually coming into the market, it is hoped that this improvement may continue. In Welsh the heat of the weather has been so great as to render it difficult for some of the operations at the works to be carried on, and had the demand been good, there would have been some inconvenience experienced in the execution of orders. In Swedish iron, the demand continues pretty good, and a fair amount of business is taking place. In Scoth Pig iron, the market has been unusually active during the week, and altogether a more extensive business has been done than has taken place for some time past. Prices have decidedly improved at the commencement of the week, standing at 52s. 2d., and gradually advancing up to 52s. 9d. to 52s. 10½d. cash, and 52s. 11d. to 53s. one month; buyers remaining at 52s. 9d. and 53s. one month, sellers asking 1d. more.

Bars, Welsh in Lond.	£6 5 0	@..	Do. railway, Wales.	£5 10 0	@£5 15 0
Ditto to arrive	6 5 0	.. ....	Do. Swd. in London	9 15 0	10 0 0
Nail rods	6 15 0	7 0 0	To arrive	10 0 0	.. ....
" Stafford in Lond.	7 7 6	8 10 0	Pig, No. 1, in Clyde	2 12 9	2 16
Bars	7 5 0	9 10 0	Do. f.o.b. Tyne, Tees	2 9 6	.. ....
Hoop	8 2 6	9 15 0	Do. Nos 3, 4, f.o.b. do	2 6 6	2 7 0
Sheets, single	9 0 0	11 0 0	Railway chairs	5 10 0	5 15 0
Pig, No. 1, in Wales	3 15 0	4 5 0	" spikes	11 00 0	12 0 0
Refined metal, ditto	4 0 0	5 0 0	Indian Charcoal Pigs in London, pr. ton	7 0 0	7 10 0
Bars, common, ditto	5 10 0	5 15 0			
Do. merch. Tyne or Tees	6 10 0	....			

STEEL.

Swed., kegs (rolled)	14 5 0	.. .. .	Swed., in faggots	16 . .	 0
" (hammered)	14 15 0	15 00 0	English, spring	17 . .	23 . .

THE COAL TRADE

NEW YORK, July 17, 1868.

Coal in large quantities is becoming very scarce. The strike in the various regions is beginning to effect the trade. Should it discontinue now, of which there seems to be some likelihood, it is thought there will not be any material advance in prices. Choice Coals are 25c. to 50c. higher, and dealers do not seem particularly anxious to make sales at these rates. We do not see fit to change our quotations this week, as trade has been so very dull, and we hear of very few sales being made at the advanced price. Freights have a downward tendency in consequence of fewness of orders.

Provincial Gas Coals are more active. Dealers will notice an advance in freights from different points.

The amount of coal exported from the port of New York for the week ending July 14, was:

Exports for the week, tons	1.476
Do from January 1st, do	34.46
Do. same time last year, do	40,008

BOSTON, July 15, 1868.

English Cannel is quiet, and prices are nominally $20 per ton. Sydney is selling at $8 00a8 25, and Pictou at $7 50a7 75 per ton. Cumberland is steady at $8 00a8 25; and to be delivered at Baltimore the sales have been at $4 75, and at Georgetown $4 35 per ton. Pennsylvania and Westmoreland Gas are steady at $7 20 per ton, delivered in Philadelphia. Anthracite has been selling at $6 00a6 50 by the cargo, and $7 00a7 50 in retail lots.

PHILADELPHIA, July 15, 1868.

The market is dull and depressed, but prices generally are steady.

The following table exhibits the quantity of Coal passed over the following routes of transportation for the week ending July 11, 1868:

	1867.		1868.		INC. OR DEC	
	WEEK.	YEAR.	WEEK.	YEAR.	WEEK.	YEAR.
Phil. & Reading R. R.	61,232	1,682,591	35 965	1,664,362	d 25,267	d 18 229
Schuylkill Canal	26,409	453.732	24 400	458,283	d 2,009	i 4,551
Lehigh Valley R. R.	51,692	1,050,952	21,609	1,287,176	d 30,283	i 236,223
Lehigh Canal	35.122	360 926	26,188	379,376	i 8,934	i 18,450
Scranton North	9,559	211 135	13,926	254,691	i 4,367	i 43.556
" South	27,609	669,165	19,173	565,371	d 8,536	d103,794
Penn'a Coal Co. Rail	18,348	394.733	22,359	445,178	i 4,011	i 50,445
Penn'a Coal Canal	598	8,828	708	11.688	i 110	i 2.890
Del. & Hudson Canal	41,416	575.258	50.927	631,811	i 9,511	i 53,553
Shamokin	11.988	247,547	7,740	242,121	d 4,248	d 5.436
Trevorton	1,587	23,766	363	11.590	d 1,223	d 12,376
Short Mountain	2,117	84,498	1,675	51,745	d 442	i 17.276
Lykens Valley C. Co.	1,936	32,123	1,994	43.102	i 57	i 10.979
Huntingd'n & B'd Tp	4.782	124,118	5.978	125,025	i 1,196	i 907
W'mstown Col'y, E.	2.763	52,482	3,069	89,830	i 306	i 37.347
Wyoming South	18,040	83,395	12,619	94,337	d 5,421	i 10,942
Wyoming North	.....	.....	5,483	8,263	.....	.....
Lehigh & Susq. R.R.	.....	.....	8,727	196,273	.....	.....
Total	315 198	6,005,249	262,903	6,560,022	.....	.....
	262,903	.....	.....	6 005,249	.....	.....
Decrease	52,295	.....	.....	554,773	.....	.....

Schuylkill Coal Trade.

BY RAILROAD AND CANAL, FOR THE WEEK ENDING JULY 17, 1868.

	RAILROAD.	CANAL.
St. Clair	189	.....
Port Carbon	662	686
Pottsville	577	821
Schuylkill Haven	2.504	4,794
Auburn	1,930	.....
Port Clinton	855	18
Company's use	561	.....
Total for Week	10,078	6 311
Previously this year	1,554,362	458,283
Total	1,674 440	454,594
Same time last year	1,757,143	483,727
Decrease	82,703	29,127

Cumberland Coal Trade.

BY B. & O. RAILROAD.—The shipments over the Baltimore and Ohio Railroad for the week ending July 11, were as follows:

Consolidation Company	1 627 15
Borden	724 02
Midland	616 19
Midlothian	58 03
Allegany	35 17
From George's Creek, via. Piedmont.	
George's C. & I. Company	1,928 14
Central	3,339 12
Atlantic	1,525 15
Swanton	857 07
Potomac	995 07
Piedmont	1,063 17
Franklin	9 16
Hampshire	1,782 13
Total	14,515 17
From Eckhart R. R. C. & I. Co	4,635 19
Total	19,151 16

BY C. & O. CANAL.—There were despatched from this port, during last week, 6,502 19 tons of Coal, forwarded by the following companies:

American	541 07
Borden	1,000 02
Central	2,994 18
Consolidation	1,225 15
C. & I. Co	421 10
H. & B	319 07
Total	6,502 19

Report of Coal transported over the Lehigh Valley Railroad, Week

ending July 11, 1868, and previously this season, compared with same time last year:

Where shipped from.	Week. Tons. Cwt.	Previously. Tons. Cwt.	Total. Tons. Cwt.
Total Mahony	2,068 17	267 455 05	269,524 02
Total Hazleton	10,806 19	595.013 05	605,820 04
Total U. Lehigh	284 19	30.991 19	31,276 18
Total B. Meadow	4,657 10	231,400 16	236,058 06
Total Wyoming	3,790 18	140 795 11	114,496 09
Grand Total	21,609 03	1,265,566 16	1,287,175 19
Same time last y ear	51,692 05	999.260 00	1,050.952 05
Increase		266,306 16	236 223 14
Decrease	30,083 02		
Forwarded east of M. Chunk, by rail	21,609 03	1,265 566 16	1,287,175.19
Delivered at M. Chunk and on line of road ab. that point	397 00	15,939 10	16,336 10
At Penn Haven for shipment by canal	8,719 05	37,867 13	46,586 18
At Mauch Chunk for shipment by canal	1,497 11	28,598 98	30,095 19
Toll by eail and canal	32.222 19	1,347,972 07	1,380,195 06
Same time last year	54,700 04	1,038.811 07	1,093,511 11
Increase		309,161 00	286,683 15
Decrease	22,477,05		

Report of Coal Shipped by Lehigh Canal,

Week ending July 11, 1868, compared with same time last year:

WHERE FROM.	Week. Tons. Cwt.	Total. Tons. Cwt.
Mauch Chunk Region	7.307 08	158,368 05
Beaver Meadow Region	2,474 06	29,756 10
Mahanoy Region	224 09	1.354 00
Hazleton Region	9.010 11	114,806 10
Upper Lehigh Region	578 18	7,572 04
Wyoming Region	6,592 15	67,519 02
Total	26,188 07	379.376 06
Corresponding week last year	35,122 11	360,926 07
Increase		18,449 19
Decrease	8,934 04	

Lehigh and Susquehanna Railroad, Week ending July 11.

WHERE FROM	WEEK. Tons. Cwt.	TOTAL. Tons. Cwt.
WYOMING REGION.		
Haverill	.....	.....
Newport Coal Co	.....	.....
Valley Coal Co	.....	.....
Warrior Run Mining Co	.....	.....
Parrish & Thomas	661 06	6,227 17
New Jersey Coal Co	295 12	8,151 06
Lances' Colliery	11 07	11 07
New England Coal Co	35 04	35 04
Lehigh & Susquehanna	.....	15 10
Germania Coal Co	440 03	10,218 03
Franklin "	25 04	25 04
Audenreid Improvement	.....	.....
Wilkesbarre Coal & Iron Co	8 562 07	112,773 11
Union Coal Co	.....	2,040 07
Mineral Spring	.....	6,929 06
H. B. Hillman & Son	.....	1,303 17
Bowkley, Price & Co	.....	2:8 14
Wyoming	.....	3 006 09
Henry	370 17	3,354 19
J. H. Swoyer	10 00	2,749 06
Everhart Coal Co	.....	.....
Albrighton, Roberts & Co	564 07	2,643 03
Shawnee	892 04	6,844 09
Morris & Essex Mutual	.....	78 19
Delaware & Hudson Co	252 09	5,167 03
Pine Ridge Colliery	217 03	1,766 01
Consumers Coal Co	.....	1,514 09
Harvey & Brothers	.....	184 11
Total Wyoming Region	12,338 03	174,369 15
UPPER LEHIGH REGION.		
Upper Lehigh	2,471 19	60,773 11
Total Upper Lehigh	2,471 19	60,773 11

HAZLETON REGION.		
A Pardee & Co.	2,243 12	31,512 09
Linderman & Skeer	.....	756 06
Sharpe, Weiss & Co.	943 03	20,474 17
W. S. Halsey & Co	.....	1,701 09
Harleigh Coal Co.	1,107 10	15 027 12
G. B. Markle & Co.	1 084 14	23,309 03
Ebervale Coal Co.	1,209 05	14,646 06
Stout Coal Co.	121 13	7,551 11
Buck Mountain Coal Co.	681 05	8 562 10
Coxe Brothers & Co.	579 18	4,637 13
Ashburton Coal Co.	.....	64 06
Highland Coal Co.	450 08	8,365 08
Pardee Bro. & Co.	397 17	4,654 14
Jeddo Coal Co.	146 17	4,738 03
Mount Hall	.....	.....
Other Shippers	.....	927 02
Total Hazleton	8,966 02	146,929 09
FROM MAUCH CHUNK.		
Summit Mines	.....	.....
Room Run Mines	704 10	704 10
Total Mauch Chunk	704 10	704 10
" Hazleton Region	8,966 02	146,929 09
" Upper Lehigh	2,471 19	60,773 11
" Wyoming	12,338 03	174,369 15
Grand Total	24,480 14	382,777 05
Corresponding week last year	12,272 17	265,589 11
Increase	12,207 17	117,187 14
Decrease	.....	.....
Forwarded South from Mauch Chunk by rail	8,133 02	166,052 00
Delivered on line L. & S. R.R. above Mauch Chunk	593 12	30,220 17
Delivered at Coal Port for shipment by Canal	15,754 00	186,504 08
Total	24,480 14	382,777 05

Prices of Coal by the Cargo.

[CORRECTED WEEKLY.]

At New York, July 18, 1868.

Schuylkill R. A., choice	$5 50@$....		Schuylkil Chestnut	4 00	....
" Ordinary	5 25	....	Lehigh W.A Lump Old Co	5 00	...
" W. A., Lump	5 00	....	Lehigh Broken	4 87½	....
" Steamboat	5 00	....	" Egg	4 87½	....
" Broken	5 00	....	" Stove	5 12½	....
" Egg	5 25	....	" Chestnut	4 37½	....
" Stove	5 25	....	Shamokin	5 50	....

SPECIAL COALS.—DEALERS' QUOTATIONS.

Diam'd Vein R. A.,	Sch'kill	5 50	Old Co.'s W. A. Lehigh	5 50	....
Locust Dale W. A.,	"	. 5 50	Mt Pleasant	5 00	....
Honey Brook "	Lehigh.	5 50	Broad Mountain	....	....
Harleigh "	"	. 5 50	Buck Ridge W. A., Sh'kin.	5 50	....
Spring M'n "	"	. 5 50	H. Heils, E. S'klin, Lorb.	5 50	....
Sugar Creek "	"	. 5 50	New England Red Ash	5 25	....
Ashburton "	"	. 5 50	Wyoming	5 50	....

Dealers in these Coals may be found in our advertising columns.

At Philadelphia, July 18, 1868.

Lehigh Lump and S'mb't.	5 00@....		Henry Clay, Egg & Stove	....@4 40	
" Broken and Egg	5 00	....	Locust Mount Lump and Steamboat	3 25	3 40
" Stove	5 50	....	" Broken	3 35	3 60
" Chestnut	4 25	...	" Egg	3 60	4 00
Schuylkill R. A.	4 25	4 50	" Stove	4 00	4 15
" Chestnut	2 60	....	Lorberry Coal	4 50	....
" W. A. Lump	3 25	...	Shamokin	....	....
" Broken	3 25	3 50	Franklin, (Lykens Valley)	5 00	....
" Egg and Stove	3 75	4 00	Broad Top	4 60	....
Schuylkill Chestnut	2 75@....				
Hill & Harris, Egg & Stove	....	4 30			

Scranton Coal at Elizabethport, July 18, 1868.

(Corrected weekly by D. L. & W. R. R. Co.)

Lump	$4 00@....		Egg	4 50	....
Steamer	4 25	....	Stove	5 00	....
Grate	4 50	....	Chestnut	4 25	....

Prices for Pittston Coal at Newburgh, July 18, 1868.

(Corrected weekly by Penna. Coal Co.)

Lump, per ton of 2240 lbs.	$4 20@....		Egg " " "	4 30	....
Steamer, " " "	4 20	....	Stove " " "	4 65	....
Grate " " "	4 30	....	Chestnut " " "	4 15	....

70 cents additional to New York.

Lackawanna at Rondout, July 18, 1868.

Lump	$4 30@....		Egg	$4 40@....	
Steamer	4 35@....		Stove	4 75	....
Grate	4 30@....		Chestnut	4 20	....

65 cents additional to New York.

Lehigh Coal at Elizabethport, July 18, 1868.

Lump	5 00@....		Chestnut	4 25	....
Steamboat and Broken	4 75	....	Stove	5 00	....
Egg	4 75	....			

Wilkesbarre Coal at Hoboken, July 16, 1838.

(Corrected by Wilkesbarre Coal & Iron Co.)

Lump	$4 25@....		Egg	4 45@....	
Steamer	4 45	....	Stove	4 85	....
Broken	4 45	....	Chestnut	4 25	....

At Baltimore, July 18, 1868.

Wilkesbarre & Pittston W. A. by car	$5 25@5 50		From wharf or yard, 50c. to 75c per ton additional		
Lykens Valley R. A. by car	@ 5 55		Ret il, del'd, per 2,240 lbs	7 00@7 50	
Sunbury & Shamokin R. or W A. by car	5 00	5 50	George's C'k and Cumberland f. o. b. at Locust P't for shipping	....@4 75	

At Havre de Grace, Md.

Wilkesbarre or Pittston, W. A., on board	$....@4 85		Sunbury or Shamokin, R. or W. A., on board	....@4 85	
Trevorton R. A., on board	....	5 25	Lykens V'y, R. A. on b'd.	....@5 50	

Havre de Grace is the terminus of Susquehanna and Tide Water Canal.

At Georgetown, D. C. and Alexandria, Va.

George's Creek and Cumberland f. o. b. ..... $....@ 4 35

Prices of Gas Coals.

July 18, 1868.

PROVINCIAL. Duty, $1 25	Coarse. Gold.	Slack. Gold.	AMERICAN.	Coarse. Currency.	Slack. Currency.
Block House	$1 75	$ 75	Westmoreland Co.	$8 50	$8 00
Gowrie	1 75	75	Despard Coal Co.	8 25	8 00
Lingan	1 75	75	Penn	8 50	8 00
Sydney	2 13¾	71¼	Newburgh Orrel Gas	8 50	8 00
Pictou	2 13¾	1 18¾	Delivered in New York.		

Prices of Foreign Coals.

Duty $1.25 per ton.

Corrected weekly by PARMELEE BROS., 32 Pine Street, N. Y.

Liverpool Gas Caking	$ 9 50	Liverpool House Cannel	18 00@19 00
" " Cannel	14 00	" " Orrel	16 00@18 00

Per ton 2240 lbs., Ex. ship.

PRICES FROM YARD:

Liverpool House Orrel, scr'd..$18@20 | Livp'l House Can'l, scr'd. 22 00@— —

per ton 2000 lbs. delivered.

Coal Freights.

(Corrected Weekly.)

Rates of Freight from Newburgh

RIVER.		EASTERN.	
On "Pittston" Coal, by boats and barges of the Pennsylvania Coal Company, per ton of 2,240 lbs.		Stamford	$1 25
Troy and West Trov	$ 55	Norwalk	1 25
Albany and Greenbush	50	Bridgeport	1 25
Coeymans	45	New Haven	1 25
oxsackie and Stuyvesant	40	New London	1 40
udson & Catskill	35	Norwich	1 50
'ugerties and Barrytown	35	Mystic	1 45
neebe ck and Rondout	30	Stonington	1 45
k[illegible] and New Paltz Land.	25	Sag Harbor	1 45
Fishkill Landing	20	Bristol	1 55
Cold Spring and West Point	20	Newport	1 55
Peekskill	40	Fall River	1 55
Haverstraw	45	Providence	1 60
Sing Sing and Nyack	50	Dighton	1 60
Tarrytown and Piermont	50	Warren	1 60
Yonkers	55	Pawtucket	1 75
The Coal must be discharged with all reasonable dispatch, at the expense of the consignee, who shall also pay wharfage on the boat. Boatmen will tend guy while unloading.		New Bedford	1 90
		Boston	2 10
		East Cambridge	2 20
		Salem	2 10
		Newburyport	2 20
		Portsmouth	2 15
		Portland	2 00

Freights on Coal Sea-borne from Port Richmond, Philadelphia.

July 15, 1868.—From Philadelphia & Reading Railroad Wharves, Phila., to

Boston	—	2 60	New York	—	1 30
Portland	2 50	2 65	Cambridgeport	—	2 60
Salem	2 60	2 65	Hingham	—	2 75
Providence	—	2 10	Newberryport	2 85	2 90
New Bedford	—	2 20	Nantucket	—	2 60
Dorchester	—	2 60	Williamsburg	—	1 30
Gloucester	2 60	2 75	Bangor	—	2 60
Pawtucket	—	2 25	Beverly	—	2 00
Brooklyn	1 28	1 30	Braintree	—	3 00
Portsmouth	2 80	2 85	Fall River	2 10	2 15
Norwich	—	2 00	Harwich	—	2 60
Chelsea	—	2 60	Medford	—	3 10
Charlestown	2 63	2 70	Newport	—	2 10
Lynn	2 75	2 80	Mystic	—	2 10
Weymouth	—	2 70	Hackensack	—	1 55
Bath	—	2 80	Charleston	—	1 75

From Elizabethport and Port Johnston.

Albany	$ 85@	—	New London	$1 15	—
Boston	2 00	—	Newport	1 40	—
Bridgeport	1 00	—	New York	60	—
Fall River	1 45	—	Norwalk	1 00	—
Hartford	1 50	—	Norwich	1 35	—
Hudson	1 00	—	Pawtucket and towing	1 60	—
Lynn	—	—	Portland	1 90	—
Middletown	1 25	—	Portsmouth	2 10	—
New Bedford	1 50	—	Providence	1 10	—
Newburyport	2 15	—	Salem	1 75	—
New Haven	1 00	—	Augusta	2 25	—

Rates of Transportation to Tide Water.

[BY RAILROAD.]

To Port Richmond.—(Philadelphia.)

Philadelphia and Reading R. R. from Schuylkill Haven $2 00

The following are the drawbacks allowed on all coal shipped East of New Brunswick and South of Cape Henry, until further notice:

	Drawback.	Freight.	Nett.
Lump	$1 25	$2 00	$ 75
Steamboat	1 15	2 00	85
Broken	1 00	2 00	1 00
Egg	65	2 00	1 35
Stove	50	2 00	1 50
Chestnut	75	2 00	1 25

From Port Carbon, 8 cents per ton more.

To Elizabethport.

L. V. Railroad from Mauch Chunk to Easton	$ 69
C. R. R., N. J., Easton to Elizabethport	1 06
	1 75
Shipping Expenses at Elizabethport	25
Total	2 00

To Port Johnson.

L. V. R R	$ 69
C. R. R of N. J.	1 12
Shipping Expenses	25
Total	2 06

To Hoboken.

L. V. R.R.	69
Morris & Essex R.R.	1 12
Shipping Expenses	25
Total	2 06

[BY CANAL.]

To Port Richmond.

From Schuylkill Haven to Port Richmond	$1 00
Freights and tolls by Raritan Canal	1 90
	2 90
Drawback	30
Total	2 60

To New York.

From Mauch Chunk to New Brunswick, by Lehigh, Del. Div. and Del. & Raritan Canal	$ 90
Freights through	1 25
Towage	20
	2 35

To New York via Morris Canal.

Lehigh Canal	$ 34
Morris "	40
Towage	10
Freight	1 55
Total	2 39

Expenses from Mauch Chunk to Jersey City for Re-shipment.

Lehigh tolls (net)	$ 34
Morris "	34
Freight	1 50
Re shipping	30
Total	2 48

Provincial Freights.

TO NEW YORK.		TO BOSTON.	
Sydney	3 25	Sydney	$2 75
Lingan	....	Lingan	2 65
Cow Bay	....	Cow Bay	....
Port Calidonia	$3 50	Port Calidonia	3 00
Little Glace Bay	3 25	Little Glace Bay	2 75

Foreign Freights.

New Castle and Ports on Tyne	€13@15 keel
Liverpool	12s. 6d.@15s. ton.

New York Imports of Metals, &c.

The following will show the imports of Metals, &c., at the port of New York from foreign ports, for the week ending July 17, 1868. The quantity is given in packages, unless otherwise specified.

Metals, &c.	Quantity.	Value.		Quantity.	Value.
Brass Goods	8	1,382	Iron, other, tons	718	19,146
Bronzes	10	3,150	Lead, Pigs	6,589	51,910
Chains & Anchors	19	1,220	Metal Goods	74	11,651
Copper	..	104	Needles	12	4,138
Cutlery	60	16,788	Old Metal	..	2,758
Guns	47	3,924	Plated ware	3	859
Hardware	41	5,638	Percussion Caps	2	426
Iron, hoop, tons	39	2,256	Saddlery	3	1,186
Iron, Pig, tons	205	3,020	Steel	8,063	80,981
Iron, Railroad bars	25,572	137,518	Tin, boxes	14,251	90,096
Iron, tubes	1,756	3,134	Tin 1002 slabs	79,225	12,940
			Wire	532	3,923

BOSTON STOCK MARKET.

(By Telegraph.)

BOSTON, July 17, 1868.

The following were the prices of mining stocks bid to-day:

Calumet	33	Quincy	21
Copper Falls	19¼	Cary Improvement	10¼
Franklin	12	Isle Royal	—
Hecla	45	Water Power	17
Hancock	2	Bos., Hart & Erie RR	16½
Minnesota	3	Rockland	—

SAN FRANCISCO STOCK MARKET.

A Telegram from San Francisco, dated July 15, to Messrs. LEES & WALLER, Bankers, 33 Pine street, this city, quotes stocks as follows:

Stocks.	Bid per ft.			Stocks.	Bid per ft.		
Gould & Curry	109	@	107	Belcher	165	@	..
Savage (per share)	125	@	—	Uncle Sam	..	@	..
Chollar Potosi	190	@	188	California	..	@	..
Ophir	14	@	—	Imperial (per share)	124	@	126
Hale & Norcross	73	@	77	Alpha	46	@	..
Amador	245	@	—	Kentuck (per share)	364	@	..
Yellow Jacket	1,215	@	—	Cal. Steam Nav'n Co.	10	@	..

London Copper Trade Circular.

Messrs. Vivian, Younger & Bond (June 26) write: The principal transactions in Chilian produce have been in refined ingots, 100 tons Urmeneta, spot, having been sold at £75, and 160 tons of the same brand to arrive at £76. In bars only 50 tons, spot, are reported at £75, and 50 tons to arrive at £74. At these prices more are obtainable as we write. No transactions in West Coast ores and regulus are reported. Several hundred tons of English copper have been taken, both spot and forward, at prices which have not been allowed to transpire. In fine foreign, Wallaroo has made £80, 10s. cash, and £81, 10s. forward delivery, to the extent of about 250 tons. The late fall in prices has attracted notice, and consumers show somewhat more disposition to replenish their stocks.

Special Scientific Brevities.

☞ The Metropolitan station now being erected for the Midland Railway at King's Cross, London, is nearly as great an advance in the construction of roofs as the Great Eastern was in the construction of ships. The new building is erected alongside of the Great Northern station, which was a short time since regarded as a tremendous structure. Some idea of the advance made of late years may be obtained from the fact that the span of the single arch is thirty feet wider than the span of the two arches which cover the Great Northern station. It has never before been attempted to cover a space of 240 feet with one span for the purpose of forming a roof. In bridge building much wider distances have been spanned, but it has hitherto been thought unnecessary to cover so wide a space with one roof. It is not very apparent why the attempt has now been made, as two arches would have been much more economical, and, we should have supposed, equally convenient. The height of the arch from the rail level is 99 feet, and of the rails 13 feet 9 inches above the road level. There will be eleven lines of rails, and the space underneath is to be made available for cellars, of which there will be about four acres.

☞ On visiting the ironworks at Creuzot, Mr. Samuelson, M.P., was conducted over them by M. Schneider, the senior member of the firm. Mr. Samuelson writes:—Notwithstanding his public duties as President of the Corps Legislatif, M. Schneider retains the chief direction of the works. During the Session of the Chamber the immediate management on the spot is in the hands of his son (his partner, there being also a small number of other partners with limited liability), but in the recess he resides at Creuzot. After having conducted me for several hours through these vast works, M. Schneider returned to his office to complete and dispatch his correspondence, and debate the most minute economical points, items of cost and rates of carriage, with the heads of departments, showing himself, as he expressed it, "industriel jusqu'au bout des eng'es." He will forgive me for entering into these details. They are interesting to France and to England, more especially to England, where high political duties are still deemed almost incompatible with an active industrial career.

☞ Alfred Nobel's nitro-glycerine manufactory, at Stockholm, Sweden, was recently blown up. Fifteen persons were killed and several seriously injured. The destruction of property in the neighborhood was also extensive. This occurrence, if any further evidence was required in addition to what was lately given by violent and fatal explosions, shows the extremely dangerous nature of nitro-glycerine, and will do much toward weakening the statements lately made by Mr. Nobel, in leading European papers, with regard to the comparative safety of this compound.

☞ Silk, muslin, or other fibrous material may be coated with copper, silver, or gold by electricity, if they be first dipped in a solution of nitrite of silver with ammonia, and then dried and exposed to a current of hydrogen gas. The ammonia must be sufficiently in excess to re-dissolve the precipitate. The fabric treated is coated in the usual manner.

☞ Capt. Caron, a distinguished experimental chemist of Paris, announces that he has taken advantage of the property possessed by fluoride of calcium (common fluor spar) of dissolving alumina at a high temperature to obtain magnificent crystals of corundum (sapphire, rubies, &c.) He promises shortly to give a full account of the experiment.

New Boring Machine.

Considerable interest has been created in Victoria, Australia, by the successful trial of Mr. R. G. Ford's patent Rock-Boring Machine, which consists of a cylinder, about 30 inches in length over all, and 4¼ inches in diameter, having a screw bar to fix the front end against its work, upon which screw the arrangement for the machine to move itself forward is fixed—a brass nut with notches on it. The screw bar is fixed 3 or 4 inches off the side of the cylinder, and projects 1 foot 9 inches beyond the front end of it. The machine is self-acting in every movement. An ordinary-sized drill is used, made in the usual way, only not with quite so keen a cutting edge, and is made round at the butt to fit into the piston of the machine, into which it is fastened by a nut. The piston is moved in the cylinder, much on the same principle as a steam hammer, only that compressed air is used instead of steam. On this occasion the pressure varied from 80 lbs. on the square inch. The weight of the machine is 120 lbs., and the method of fixing it in a shaft or drive would be determined according to circumstances. Thus, in sinking a shaft, or in a small drive, a piece of timber 6 inches square, and long enough to reach across the shaft, with a 2½-inches screw at one end to tighten it across the shaft or drive, is all that would be required upon which the machine can be fixed to bore at any angle. But in a large and long tunnel it would be worth while, probably, to have the machine fitted on to a lorry with one cast-iron column, or two, if two machines were required. The method of conveying the air pressure to the machine from the air-receiver on the surface would be by means of 1-inch ordinary gas piping to within 30 or 40 feet of the work, when a ½-inch flexible hose must be used, in order to adjust the machine to its work, and remove it while blasts are discharged. Three-horse power of any ordinary engine is sufficient to pump the air to drive one machine. The calculation, from the only data which we have at present, shows the cost per foot of putting in 1¼-inch holes into granite is about 1s. 3d., which is about one-half of the cost by hand labor. Irrespective of the saving in money, where time is an object in sinking or driving, the machine would be very beneficially used, as it is said to save 75 per cent. in time over hand-labor—*London Mining Journal.*

The Rats of the Lower Levels.

A miner of the Imperial Mine, of Gold Hill, Nevada, publishes in a paper of that locality the following rat story which belongs legitimately to the "important if true" kind. He says: It is not generally known, except in mining localities, that rats inhabit the mines, but such, however, is the fact. From the top ground down to the lowest levels, they are to be found in our mines. Some time since the Imperial Company stopped work at the lowest level for several days to repair the shaft just above it. After resuming work, the carman, who was the first to go below, went down alone to run out the ore from the chutes and as soon as the rats heard the old familiar sound of the car rumbling along the track, they rushed out from behind the timbers to welcome the presence of man once more. They ran up to the carman in squads, climbed all over him, then down to the station floor again and scampered and gamboled around in ecstasies of unmistakable delight. When he started for the chute again with the car, they ran following and playing around him, and when he had filled his car with ore and started back again for the shaft, they (the rats) sprang upon the car and ran all over it, and jumped and leaped as if mad. The carman sat down a moment to see what they would do, when they all huddled around and ran over him without the slightest apparent fear and without offering to bite him. He did not hurt any of them, as he said if they could live in such a place he felt in duty bound to let them have the "freedom of the city."

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☞ Mr. T. P. PEMBERTON is Editor of the Mechanical Department and Agent for the JOURNAL OF MINING.

☞ Correspondents, exchanges and others addressing us should be *extremely careful* to write "JOURNAL OF MINING," instead of "MINING JOURNAL," and to give the number of our Box at the Post Office, which is 5969, to ensure safe carriage. Communications intended for publication should be plainly written, and on one side of the paper only.

BRANCH OFFICE.—MESSRS. M. A. LATHROP have been appointed our sole agents in the New England States for the AMERICAN JOURNAL OF MINING and our Spanish paper EL CORREO HISPANO-AMERICANO. Their address is 11 Court street, Boston, Mass., where all information respecting communications, subscriptions and advertisements for these papers will be gladly given to those who may wish to favor us with their patronage.

NEW YORK, SATURDAY, JULY 18.

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ORIGINAL PAPERS — Notes on Lower California, No. IX., by W. M. Gabb, Esq.
MINING SUMMARY—Official Report of James W. Taylor, on the Mineral Resources of the United States, east of the Rocky Mountains, comprising: The Great Plains—New Mexico—Colorado—Wyoming—Montana—Dakota—Minnesota—Canada—Nova Scotia—The Alleghany Gold Fields—Metallurgical Treatment — Taxation — Transportation — Treasure Product of the World—General Observations.
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IRON TRADE.
COAL TRADE.
PATENT CLAIMS.
ALL SORTS.
NEW PUBLICATIONS.
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ON DITS.
ANSWERS TO CORRESPONDENTS.

In consequence of a new regulation recently adopted by the Postmaster of this city to facilitate the early delivery of mail matter, we have to request our correspondents, in addressing us, to give the number of our post-office box, No. 5,969, in lieu of, or in connection with our business office address.

U. S. COMMISSIONER TAYLOR'S REPORT.

This report claims to give a statement of the mineral resources of the States and Territories east of the Rocky Mountains—the work west of that divide having been put into the hands of ROSS BROWNE. How well the latter has performed his task the readers of the JOURNAL OF MINING who have followed us in our review of his report are well aware. It would seem that the line of the Rocky Mountains made a very equible division of the field of labor. Any one who possesses a reasonable amount of knowledge in regard to the extent of the two parts of the country, and of the present state of the mining interests in each, would, we believe, join with us in the remark that the adoption of the line of the Rocky Mountains as the boundary between the two, would give to the Commissioners, in case each performed carefully and faithfully the work assigned him, as near as may be, the same amount of labor. If the territory assigned to ROSS BROWNE is less in extent, the difficulties and delays of travel are, comparatively speaking, greater, while there is, perhaps, a more uniform distribution of mineral wealth. Since the appearance of a full and excellent report of upon the Western States and Territories, we have awaited with a good deal of interest the publication of JAMES W. TAYLOR'S statistics in regard to the mineral resources of the States and Territories east of the dividing line of their field of labor. Although his preliminary report, which came before the public in the month of Feb., 1867, was published in one number of the JOURNAL OF MINING, occupying therein a space of only about six pages, we must remark, here, that we have entertained the belief that the Commissioner would not fail at the end of another year of labor, and in what passes for a complete report, to submit to the government a document, not only in volume, but also in value of its contents, fully commensurate with the vast extent of the mineral deposits embraced within the limits of the area assigned him. No one can doubt, for an instant, that a proper report upon the mineral wealth of that region would occupy quite as much space as that upon the western division. The field is altogether too large and important for one to do justice to it in a document occupying hardly more space than a mining company's prospectus. But the report is at hand: there is, therefore, an opportunity of speaking of it directly as it is, instead of intimating what one would expect it should be. As regards the size of the document, we have to say it is not very large. Of itself, there is not enough to make a volume to respectable appearance, hence we find it tacked on to the end of Ross BROWNE'S report. The body of the work, though we are hardly justified in using the word *body*, since of the two the appendix is the larger, covers some thirty-two pages of an octavo volume, while the appendix aforesaid makes up some thirty-nine pages of quite closely printed matter. Altogether, then, the Government has, as the result of Commissioner TAYLOR'S labors for the past year, seventy-one octavo pages of matter; enough, to be sure, to make a pamphlet of tolerably respectable size, but scarcely more.

But now let us glance somewhat in detail at the contents of this document. Let us see what space has been given to the various States and Territories that lie within the commissioners province, or, more correctly speaking, to *some* of those States and Territories. A page or two upon the Great Plains is followed by about as much of general description upon the Territory of New Mexico. The slight mention that is made of its mines may be appreciated when it is remarked that they are all done for in the space of half a page. Colorado next attracts attention. To this Territory, rich in mines of gold, silver and copper, so well-known that even a tolerably full report upon its mineral resources ought to have occupied a space quite equal to that covered by all that has been given, without excepting even his appendix—to this Territory, we remark, there has been alloted the space of about five and a half pages! Dakota escapes with a few comments, of no particular consequence. Perhaps that Territory is so thoroughly unexplored that nothing further could have been said. If so, it would have been far better to have said nothing at all, and made some little mention, at least, of mining and metallurgical industries, whose power is felt in every part of the country. The mines of Minnesota furnish food for a few remarks.

How it is that a dissertation upon the mineral resources of Canada and Nova Scotia should come to occupy the prominent place that it does in what purports to be statistics upon the mineral resources of the States and Territories east of the Rocky Mountains, does not so readily appear, more especially when we look in vain for noted mineral regions within our own territorial limits. Most assuredly, in what claims to be a comprehensive report, one would expect to find a paper upon the mineral deposits of the Lake Superior regions. But of the extensive copper and iron industries of that locality the report is silent. Why, again, is it that we can find nothing in this document upon the mineral wealth of Missouri? Her mineral deposits extend over an area of nearly eighteen millions of acres. Her treasures of lead, iron, and coal are immense; nor has she an insignificant supply of other metalliferous deposits; but notwithstanding all this, notwithstanding the fact that an accurate and comprehensive official report upon her varied sources of mineral wealth would have a natural tendency to draw enterprise and capital within her borders, and thereby confer upon her, as also upon the country at large, a lasting benefit, we are obliged to give up the search. An official document on our mineral resources east of the Rocky Mountains has nothing to say for Missouri! Nor yet has any space been given by Commissioner Taylor to an account of the lead deposits of North-Western Illinois. They have been worked for years, and form no small element in making up the totality of the mineral resources of the East. But have we no other prominent mineral regions that have escaped the attention of this statistician? Most certainly. He seems to have taken no note of the Ducktown copper mines of East Tennessee. At that point we have magnificent deposits of copper ore of excellent quality. They are perhaps second only in importance to those of Lake Superior, and, in an economical point of view, appear at the present time to be somewhat in advance of all other copper mines. So abundant, and so excellent the quality of the ores, and so favorably situated are the mines for working, that ingot copper can be delivered in New York at, it is said, about 16½ cents per pound! And yet this growing, and soon to be controlling copper mining industry, in so far as the Commissioner's report is concerned, would not be known to exist. In addition to her copper mines, Tennessee is rich in deposits of iron, lead, coal, and other minerals. Her abundant resources in minerals ought to have been clearly and fully set forth, so that capital might be attracted thither for their development. Tennessee would then have reaped some benefit from this official document. As the case now stands, she is without a name.

The mineral resources of Virginia, North Carolina, South Carolina, Georgia and Alabama, are mentioned, to be sure, but hardly more. The little that has been said under the general head of "The Alleghany Gold Fields," can never be of any particular benefit to any one. The immense coal, iron, petroleum and slate interests of Pennsylvania have not been deemed worthy of the slightest consideration! The slate and marble quarries of Vermont, her copper mines—why do we not hear something of them? The iron ore deposits and smelting works in Northern New York are of great importance, and new developments are now under way, that will tell largely in the iron trade of the country, but we hear nothing of them. If, instead of devoting one-fifth of his report to mining localities outside of the United States, at least a word had been said in regard to these, and many other mining interests, the whole affair would not look quite as bad as it now does. The United States Government can hardly afford to pay for reports upon the mineral resources of Canada and Nova Scotia, while, with two or three exceptions, nothing of any real interest or value is submitted upon her own. We will not forget to mention that the paper embodied in the appendix of the report upon the mineral resources of Montana, by W. S. KEYS, M. E., is an excellent article. It will not be necessary for us to "glean" from this report; it is not so voluminous but what we can publish it all in one or two numbers of the JOURNAL OF MINING. We have simply one remark further to make, and that is, that it is a disgrace, a veritable shame, that this seventy page pamphlet should go forth to the world as an *official document* claiming to be a "Report upon the Mineral Resources of the States and Territories East of the Rocky Mountains."

If we have been somewhat severe in this review we feel that the circumstances of the case fully justify us. But we will now turn this document over into the hands of our readers; perhaps they will be more merciful than we.

WITHERITE OR CARBONATE OF BARYTA.

We are in possession of several letters from correspondents inquiring about the commercial value and uses of the above mineral, mentioning at the same time that they possess large deposits of it. Thus far this substance has been rather scarce, so much so, indeed, that it has never come into the market. It is impossible, therefore, to find a regular market price for it at the present time. Should it be produced in quantities sufficient for manufacturing purposes, a price would then be established. As the matter now stands, the limited quantity at hand sells for what one can get.

As to the uses; the so-called *blanc fixé* is an artificial sulphate of Baryta, prepared for the trade in a moist condition, in the form of a dough, as it would lose some of its valuable qualities in drying. It is used as a water color for the inside of dwellings, frescoes, paper hangings, card boards, porcelain cards, etc.; for all of which purposes it is unsurpassed in its pure white, permanent color. The natural sulphate of baryta, or heavy spar cannot be pulverized so finely, and has, perhaps, less body, nor does it cover so well in painting. But it is, notwithstanding, used to a very great extent, for the adulteration of white lead. It is, by chemical treatment, changed into an artifical sulphate in the following manner: it is ground and mixed with tar, or other substance which carbonizes by heat. It is then mixed with one quarter of its weight of pulverized coal, and submitted to a white heat, in a properly constructed furnace. The carbon combines with the oxygen, and the barium with the sulphur—the latter combination giving sulphide of barium which remains in the furnace. This sulphide of barium is dissolved in hydro-chloric acid, and forming chloride of barium. This, after filtration, only requires precipitation by means of sulphuric acid, in order to give the artificial sulphate in the form of an impalpably fine powder. This operation which is much more circumstantial than appears from this condensed account, may be shorted when using carbonate of baryta. GENTELE, in his lately published work on the manufacture of paints, says: "The artificial sulphate of baryta is almost exclusively made from the natural, but another mineral would be much better for this purpose, as it would simplify the manufacture considerably; namely, the natural carbonate of baryta, or witherite. It is a pity, however, that this mineral is so rare, and that there is so great a demand for it for other purposes, that it is out of the question to use it for the manufacture of the *blanc fixé*."

Carbonate of baryta may also, with very great advantage, be used as a substitute for lime or chalk in the manufacture of acetic acid from wood vinegar. The acetate of baryta being a much more stable compound than the acetate of lime, will stand more heat and allow driving off all the pyroligneous compounds. The baryta used is regained as *blanc fixé*, when we decompose the acetate of baryta by means of sulphuric acid. Also in the manufacture of stearic, and associate acids, baryta may be advantageously used instead of lime.

Chloride of barium, nitrate of baryta, caustic baryta, and all other compounds of this element so useful to the chemist, are best made from the carbonate. It is the great agent for detecting the presence of sulphuric acid or sulphates. In order to manufacture the above mentioned white paint from witherite, all that need be done is to dissolve it in nitro-chloric, and then precipitate with sulphuric acid.

The only locality that we have heard of where it is found in quantities is in England. It is, however, not very pure, being associated with galena. We presume, therefore, that its presence on this continent is another addition to our already numerous mineral resources.

ENGLISH CAPITAL IN COLORADO MINES.

Matters seem, at last, to be taking definite shape in regard to the development, and, we hope, the success of a cluster of the Colorado mines. In the mineral department of the Paris Exposition, the American ores presented a magnificent appearance. Among them, we learn that those of Colorado, Idaho, and Nevada, attracted the most attention. This fine display of the magnitude and richness of our, for the most part, undeveloped mineral veins arrested, it seems, the attention, not only of the French government, but also set British capitalists to thinking in a way that is likely to result in a practical effort on their part to make the Colorado ores prove a source of revenue. It is only about two months ago we intimated that the time was at hand for American capital, under the guidance of intelligence, honesty, skill, and practical experience, to seek proper investment in those mineral deposits. We should be glad to know that it was an American rather than an English company that are now making arrangements to open up carefully and systematically, one of valuable mining properties of a Colorado district. But in view of the bitter experience of the capitalists of Eastern cities in regard to

their investments in that Territory, we do not wonder that they stand aloof. It would be, however, a matter of regret if they were to fail to note the signs of the times, and allow English enterprise and capital to get the controlling influence in one of the richest mining districts of the West. The following results of the working of a mass of Colorado ore at Swansea, speak for themselves as regards the anticipation of this company's success. One of our exchanges says that "Prof. Hill forwarded seventy tons of ore to Swansea for reduction, and, although it had to bear 5,200 miles of carriage, the result was most satisfactory; the total cost, including mining, carriage, freight, and charges, and cost of working at Swansea, being $12,250, while the total value of produce in gold, silver, and copper, was $19,136, leaving a net profit of $6,886 upon the seventy tons." We learn that it is the intention of this English Company to work not only their own ores but also those of other mines in their vicinity. Nor do they propose to stop at that. They believe they can rework at a profit the tailings of the existing mills, immense quantities of which can be procured at very reasonable rates. Colorado will be glad to know that capital is coming again within her borders, even if it does come from London instead of New York. A real, substantial success on the part of this new enterprise, would certainly be a source of great gratification to the citizens of Colorado, nor, could it, on the other hand, fail to arouse the attention of our own moneyed men to the fact that the reign of folly and ignorance is at an end; that the day of stamp mills without mines has gone by. With a successful example before them, they might feel inclined again to give a hand in hastening the proper development of those unusually rich deposits of metalliferous ores. We shall watch, with a good deal of interest, the movement of this company in entering upon, and carrying out the enterprise for which it has been formed, confident that, if in rewards, it should prove a great success to them, as a lesson and example, it would be equally beneficial to others.

LABOR vs. CAPITAL—THE COAL MINERS' STRIKE.

The coal fields of Pennsylvania have again become the ground upon which labor wages war against capital. A strike for eight, instead of ten hours' work as a day's labor, together with a demand for greater pay has, it appears, become general through all the coal regions of the State. It is the old fight over again, but it threatens to extend itself beyond the collieries this time, and affect not only iron furnaces but also railways. The miners, it seems, are the originators and promoters of the strike. They are marching in bodies from point to point visiting rolling-mills, railways, furnaces, and machine-shops, compelling the laborers to quit work. It seems, however, that in most instances compulsion is unnecessary, as the iron men turn out as soon as they are visited by the miners. There seems to be a sort of tacit understanding between the two classes. It is hardly a matter of question as to what will be the end of this beginning. The present rates of coal in the market are so low that capital would loose more to raise the price of labor than it will to remain idle. Then again, if the collieries remain unworked for a while there may be an advance in the prices of coal, so that there will result in the end a partial compensation for their losses from stoppage. It is very clear that the strikers can effect nothing to their own good in this matter, even if they were to confine their efforts to lawful acts, which it seems they are not disposed to do. Their lawless conduct will, at the very outset, take from them the sympathy of any who might otherwise feel disposed to look favorably upon their movement. The labor of the working man is his capital. The latter is lost with the former. He who has to support himself and family from day to day by means of work, cannot afford to remain idle. The demands of trade for capital are not as imperative as those of nature for labor. It is impossible for any combination of the laboring classes to exert a power that will enable them for any length of time to control the laws of trade. If they would have increased wages let them, in a lawful manner, exert an influence whereby the demand for labor will be greater. That would bring along with it, naturally, an increase of wages.

Any one who sympathizes with the laboring-classes will be sorry to see such ill-advised movements on their part. There should be no antagonism between labor and capital. On the contrary, harmonious action between the two should be constantly maintained through the medium of wise and timely counsel. It is only in such a manner as this that labor can hope to hold her own. If unfortunate circumstances cause depression in trade, labor should expect to concede to capital; if on the other hand circumstances are favorable to active trade, so that there is a great demand for labor, nothing is more certain than that capital will concede to it. In so doing she will advance her own interests.

ANOTHER LAMP.

A little while ago we had occasion to speak of a new safety-lamp, the merits of which had been set forth quite fully in the scientific papers of the day. We remarked at the time that if the lamp was really as meritorious as was claimed, there would seem to remain but little more to be sought for in the way of a perfect safety-lamp. It seems, however, that along this line of investigation, a good deal of brain-power is being expended. With the invention of the lamp above referred to, effort in that direction did not stop. The French who seem peculiarly given to lights, lamps, etc., have come out with what is called a "real safety-lamp." Hopefully, it is not such a real safety-lamp, that through some one cause or another, it will be found quite unpractical. Whether it can be turned to practical account is a point to be determined hereafter. If it can we should say the point of perfection, as regards safety, has been reached at last. The following which comes to us by way of England, tells the object attained by this new invention:

"In all the safety-lamps which have hitherto been constructed, there has been the noticeable defect that contact between the flame and the external air was possible, so that under certain conditions the ignition of the explosive atmosphere in which the lamp might be placed would sometimes occur. To prevent the possibility of danger from this cause, Messrs. LIAUTE and DENOYEL, students in L'Ecole Polytechnique, of Paris, have devised a lamp in which the gas necessary to support combustion is generated in the lamp itself. In an experiment made at Paris, one of the lamps was burned for three-quarters of an hour, eight feet under water, and when drawn up was burning as brightly as at first."

Answers to Correspondents.

A. M., OF ILL., wants to know the amount of silver contained in common European galena. As far as we can ascertain, the galena the richest in silver is that of Vialard, France. It contains three-tenths of one per cent. The galena of Baden, Germany, contains one-seventh of one per cent. of silver, while that found in Puy de Dome, France, contains only one-fiftieth of one per cent. Metallic lead of commerce contains, usually, from one-twentieth to one-fortieth of one per cent. of silver.

K. L., OF MISS.—One of the cheapest paints, without oil, for out-door work, is made from three lbs. of copperas, sometimes called green vitriol, 6 galls. of water, and 1 lb. of resin. After boiling and stirring, add 3 lbs. of rye flour; boil again and stir until it becomes a paste of the proper consistency. Any kind of color may then be introduced into the preparation, as, for instance, amber, ochre, etc. Of course, this coloring matter must be in the form of a fine powder.

A. G. HUNTER, FAIR HAVEN, CONN.—Asks if any of our subscribers can inform him where a cheap and abundant supply of *carbonate* of baryta (not sulphate) can be procured, to the extent of 100 to 200 tons weekly.

JOSEPH SQUIRE, M. E., MONTGOMERY, ALA.—This correspondent says that he is in possession of a large deposit of carbonate of baryta, but does not know the market value of the article. He asks us to inform him of its worth. We reply at length in our editorial columns.

WM. P. BLAKE, NEW HAVEN, CONN.—An organization called the Annular Diamond Drill Co. had an office in this city about two years ago. The company, we believe, has gone out of existence. John F. Trow, No. 50 Greene street, N. Y, can give you further particulars.

NEW PUBLICATIONS.

A SYSTEM OF INSTRUCTION IN THE PRACTICAL USE OF THE BLOW-PIPE.—This book consists of a graduated course of analyses for the use of students, and all those engaged in the examination of metallic combinations. It is a volume of the second edition that lies upon our table. An appendix and a copious index have been added by G. W. PLYMPTON, A. M., Professor of Physical Science of the Polytechnic Institute, Brooklyn. The index, it appears, was added at the request of the present publisher, D. VAN NOSTRAND, 192 Broadway, New York City. It has doubled, to say the least, the value of the work. A scientific book of this character without an index is a poor thing. It is printed upon good paper, in clear type, and is neatly and strongly bound. We are convinced, after a thorough examination of the volume, that if one cannot have the comprehensive work of PLATTNER, BERZELINS, or other German authors, at hand, he can do no better than avail himself of the advantages of this. But it does not pretend to be anything more than an introduction to those more copious works. The arrangement of the matter presented is natural, and therefore good. Part first gives quite a full description of the apparatus and reagents used. Part second takes us through the various kinds of tests employed in the determination of minerals. Part third gives us the special reactions, first, in case of metallic oxides, and, secondly, in case of non-metallic substances. After these, follows a tabular statement of the reactions of minerals before the blow-pipe. The Appendix which comprises some of the later contributions to this department of chemical science, completes the work. So long as we cannot have a translation in full of PLATTNER'S exhaustive work on the use of the blow-pipe, in which the student is instructed not only in qualitative, but also in quantitative analyses, we shall be obliged to extend to this a cordial welcome, and hope that it may meet with a success that will be fully commensurate with its real merits, and the largely increasing demand for scientific works of this peculiar character.

THE MECHANIC'S TOOL BOOK, *with practical rules and Suggestions for Use of Machinists Iron-Workers, and others.* By W. B. HARRISON, *Associate Edutor of the "American Artisan."*

Fifty years ago, tools were of a very rude and primitive description, the lathe and drill being about the only ones then in general use; slide lathes were possessed only by a few persons, being made with great labor and expense, and very inferior in point of workmanship. The introduction of the planing machine, the slide-lathe, with its sliding and screw-cutting attachments, its surfacing motion and numerous chucks; the successive improvements in slotting, shaping, and drilling machines, with nu other ingenious and valuable tools, some worked by power, and others by steam power, all go to show the great changes, and the steady progress that have been made in mechanics' tools. The Mechanic's Tool Book treats on the care of tools, the use of files, lathe-chucks, drills, reamers, taps, &c., and also the hardening and tempering of tools. It gives practical rules and instructions for the construction of ingenious devices to meet certain manipulations of materials; it is designed assist the apprentice, and those who can copy, but are unable to originate in making their necessary hand tools, such as gauges, callipers, fitting squares, etc. The whole of the contents of this book can be perused with profit by all engineers, machinists and mechanics. The author, as a thoroughly practical man, has introduced some devices of his own invention, and with the valuable information and numerous wood-cut illustrations, we consider it is just the book that every mechanic should mark, learn, and carefully digest. It is published in neat form, printed with large type, and does credit to the publisher, D. VAN NOSTRAND, 192 Broadway, New York, who doubtless will find a large sale for the work.

EDITORIAL CORRESPONDENCE NO. VII.

SAN JOSE—NEW ALMADEN—THE QUICKSILVER BUSINESS.

CLARK'S, NEAR THE MARIPOSA BIG TREES, June 19, 1868.

Unhappy the rapid traveller, who would fain record for the pleasure and profit of home-stayers the noteworthy sights and experiences of his wayfaring! Time and events invariably get the better of him, and his perspiring pen lags hopelessly behind. For example, here are we, in the heart of the Sierra Nevada, a few hours from Yo Semite, which we shall reach to-morrow. Since last we wrote you, we have traversed the river route to Stockton, the long dry valley of the San Joachin, and the mountain road to Bear Valley, the headquarters of the administration of the famous Mariposa Estate; we have ridden a hundred miles to and fro, examining the mines and mills of that wonderful property, and the hills that shut it out from the world; we have climbed the steep passes into these mountains, through forests of stately pines to the groves of the Sequvia Gigantea. Yet the stern laws of chronological sequence compel us to go back of all these, to us, most interesting experiences, and choose for the theme of the present letter our trip to the quicksilver mines at New Almaden.

We left San Francisco by rail for San Jose, a pleasant city at the southern end of the Bay. At several intervening stations and along the road, we could observe the good effects of irragation, in beautiful gardens and orchards. At one place, a magnificent stream of water was supplied by an artesian well. The numerous windmills used for the elevation and distribution of water are a most picturesque feature in the landscapes of California, and might be introduced with advantage in many older States, perhaps for other purposes than those of irrigation. The boring of artesian wells, we fancy, is destined to be widely practised, since there are few countries where they are rendered at once so necessary by climatic conditions, and so successful by topographical features. The valleys along the mountain ranges and their foot-hills do not receive, in surface streams, an adequate proportion of the water which so vast a mountain area must collect, partly because the excessive evaporation dries up the streams, and partly because they sink into the sandy soil. But the water thus apparently lost in the earth, can be recovered by artesian borings, in which it frequently rises in vast volume and force. Wells judiciously located in such a region could hardly fail to be perennial fountains. In fact, the disappearance of water by sinking, which seems at first sight a great disadvantage to the country, is probably the means of preserving for man that necessary moisture without which the land would remain a desert, as it appeared, in many places, to the eyes of its discoverers. If the rivers ran in tight channels, doubtless this dry and ever shifting air would carry away the last drop of their moisture, and deposit it in the great, damp, disagreeable, unneccessary sea, or on remote mountain summits out of reach. San José is a pretty little city, and boasts a very fine hotel, the Auzerais. In fact, all the hotels out here are very good or very poor. The moment a mining camp or growing village can support anything more than a shanty, it advances with a spring to the first-rate St. Charles, or Metropolitan, or Cosmopolitan, or other ambitious title. Billiard-tables appear on almost inaccessible heights, and choice French wines flow amid the snows of the Sierra.

The mines of New Almaden are about thirteen miles from San José, in the Coast Range. The drive thither, through the valley, and winding up among the hills, is beautiful in the extreme. There is a good deal of timber along the road—that is, a good deal for California. The valley looks like some large park. Magnificent oaks overshadow the smooth wide road; great gardens, and wheat fields, such as never Atlantic States dreamed of, border it on either hand. The distant mountains, seeming near at hand through the clear air, are constant companions of the journey. New Almaden itself is perhaps the prettiest spot for residence in all California. Certainly we have never seen a lovelier retreat than the house, built by Gen. HALLECK, the superintendent of the mines under the Barron administration, and now occupied by Mr. BUTTERWORTH, the present superintendent. We say the house; but we mean rather the dell in which it nestles, by the side of a stream which (*rara avis!*) never runs dry.

We do not mean to repeat the descriptions which have recently been given of the mines and furnaces of New Almaden. Probably Mr. Ross BROWNE'S last report (which we have not seen, though our readers doubtless have had that opportunity ere this,) contains the latest account of them; and we shall make little use of our own copious notes, until we have discovered whether they contain anything newer or more accurate than previous descriptions. We content ourself with saying that the mines appear to us to be improving—the ore from the deepest and newest *labores* being among the best that we saw, and that, on the present limited basis of production, there seems to be no danger of exhausting the deposits of cinnabar. There is quicksilver, irregularly distributed, at so many points in the coast range, that the business of mining and reducing the ores would be open to ruinous competition, but for the peculiar commercial status of the question. As, from time to time, quicksilver mines are offered for sale in New York, and many persons imagine that this branch of mining involves large, prompt and sure profits, it will be worth while for us, perhaps, to exhibit the commercial aspect of the question for the benefit of the public. Mr. BUTTERWORTH very courteously answered all our questions

and gave us every information concerning the operations of his company. The facts we are about to give, though partly derived from him, are not secret, but well known to those familiar with the business, and quite within the reach of any inquirer. Otherwise, we are far too deeply indebted to Mr. BUTTERWORTH and his pleasant family circle to reward their hospitality with a breach of confidence.

The quicksilver trade of the world is an armed truce between Spain and California. The mine of Old Almaden, in Spain, supplies the market of London, and a large part of Europe, and ships its product as far west as the City of Mexico. Until recently, it also controlled the great Chinese market, but Mr. BUTTERWORTH, shipping ten thousand flasks to Hong Kong, and selling at far below the cost, forced the re-shipment to Spain of all the Spanish quicksilver; and the market has since been in his hands. The same tactics on the part of Spain keeps him from the London market; and the two great producers are thus forced to divide the world between them. But the New Almaden company is not the only producer of quicksilver in California, and is obliged for self-preservation to accede to a combination with the New Idria and the Redington; and it is this combination which now controls the production of quicksilver, and will probably, for a long time to come, prevent the successful establishment of any rival enterprise.

It must be borne in mind that the consumption of this metal is limited. A certain amount for manufactures, a certain amount for metallurgical purposes, and the diminishing quantity required for calomel, with what the Chinese manufacture into vermillion, comprise the principal demands. Now the quantity used in metallurgy, which is the most considerable, is hardly affected by the price of mercury. If it were a dollar a pound instead of sixty cents there would be no less consumed; if it were twenty-five cents, the demand would scarcely increase. In fact, the cost of quicksilver lost in amalgamation is (to wasteful men like our mill-men) very trifling. In Mexico, where the *patio* process is employed, perhaps a pound and a half of quicksilver is lost for every pound of silver extracted; but in Washoe the loss is (we are told) not more than a third as much. The Pacific States and territories require altogether about 1,200 flasks, or 91,500 lbs. per month; Mexico and South America, 1,000 flasks each; China, 1,000. The total annual demand does not exceed fifty thousand flasks, the production of which is divided among different companies as follows: New Almaden, 24,000; New Idria, 10,000; and Redington, 10,000. These three companies have agreed to confine themselves to the above limited amounts (the works at New Almaden, for instance, are only run to half their capacity to furnish the allotted 24,000 flasks) and to buy up the quicksilver made by all other companies. There are a number of smaller mines, like those of Guadelupe, which we visited, about eight miles from New Almaden, and which produce perhaps a hundred and fifty flasks monthly. All these mines are forced to sell to the before-mentioned combination, which pays them forty cents a pound, and sells to the public at sixty. This margin of profit may seem excessive, but it must be remembered that the returns from sales are extremely slow. The metal is sent to distant agents, and must be sold at retail before the money is received by the producer. It takes perhaps two years to work off the whole of one annual crop. With money at two per cent. a month, this delay is no joke. The present combination, which includes the BARRONS (who were in a certain degree forced to go into it, to save their profits on a large amount of quicksilver, which they had scattered through the Western Hemisphere at the expiration of their well-known contract with New Almaden,) is able to command foreign capital at comparatively low rates; and hence can afford to wait for the slow remuneration of the trade.

We have said enough to show that the present monopoly is not very oppressive to the miners of this coast; that it cannot be overthrown, except by an immense investment of capital; and that the victory, if won, would be but (we mean no pun) a Barron prize. R. W. R.

Original Papers.

MS. FURNISHED TO THE AMERICAN JOURNAL OF MINING BY HON. J. ROSS BROWNE.]

NOTES ON LOWER CALIFORNIA.—NO. IX.

[CONCLUSION.]

BY W. M. GABB, ESQ. PHILADELPHIA, LATE OF THE CALIFORNIA GEOLOGICAL SURVEY.

On the West Coast, bordering the Northern part of the Bay of Magdalena, and the long arm which extends northward, are extensive plains, nearly level, rising insensibly to the east, and, in great part, covered with a rich soil. These plains, almost throughout, destitute of the scattered stones on the surface, which render so much land on the Peninsula, valueless, are covered with a dense vegetation, of which the larger species of cactus make a great part. There is no water on the surface; and this fact alone has prevented their settlement by a native population. As soon, however, as land shall become valuable, this "monte" or "brush" will be cleared off, wells dug, and nearly the whole tract will be cultivated. Water of good quality, and unlimited in quantity, can be obtained by shallow wells; the sea breezes will supply the lifting power, and a population greater than can now be found, from San Diego to the Cape, can here find comfortable homes and an abundant subsistence. South of Loreto is a similar, but much smaller tract; which, also, like the former, has an excellent harbor of its own. Among the table mountains are San Louis, Comondu, Purissima, San Ignacio, and a dozen smaller spots, some of which are in a high state of cultivation, while others are capable of it, were there life enough in the people to urge them to it. Purissima alone ships a thousand cargoes of dried fruits annually, not to mention larger quantities of wine and sugar. Comondu has several sugar mills, occupied the whole season, and the thousands of date and fig trees of San Ignacio, fairly force their treasures into the hands of an indolent and worthless set of proprietors. The unappreciative and ignorant laziness of these miserable people is enough to keep a live man, passing through their country, in a very healthy and almost chronic state of indignation.

But one result can follow the American acquisition of Lower California. The indolent mongrel race forming its population, must give way before the enlightened energy and restlessness of our own people, as it has done in Upper California and Texas; and Anglo-American enterprise will, within a decade, render this territory more valuable, than would Mexican laziness, in a century.

But my feelings of virtuous indignation have betrayed me into an involuntary digression. North of San Ignacio, there is but little of value in an agricultural point of view, until, having passed Santa Gertrudis and San Borja, we arrive at the broad and uninhabited valley of San Andres. This valley, with the adjoining plains of Sta. Ana should, perhaps, be rather classed with the grazing than the agricultural lands. The only water existing naturally on the surface, is at the mouth of the valley, where there is a lake of brackish water more than half a mile long even in the dryest seasons. Animals drink it freely, and the grass in the valley seemed unlimited. From the position of the rocks, it is certain that water could be obtained by wells, and usually, in localities like this, the well water is good even when that of the ponds is undrinkable. With wells and windmills, several square miles of excellent land could be brought under cultivation, while an almost unlimited quantity of stock could find pasture on the adjoining plains, or in the unoccupied portions of the valley Further north are the plains of Buena Vista, in which there is no known water, but the remarks on San Andres will, with slight modification, be applicable here also. In the mountains adjoining these plains, is the deserted mission of San Fernando. The traces of former cultivation still exist, and a few hundred dollars would be sufficient to repair the irrigating apparatus, so as to bring over an hundred acres of good land into condition for planting. From San Fernando to the boundary, most of the arrable land is in the possession of private individuals, though some tracts still exist as public property, subject to denouncement, which are by no means to be despised.

After passing Sta. Tomas, we saw cereals growing without irrigation and with promises of excellent crops. Wheat, barley and oats were noticed, the former with full, large heads and short stalks. Potatoes and apples, adjoining a grain field, on the Guadalupe ranche, reminded us of home, but looked incongruous, associated with olives and figs, and overshadowed by one or two tall and graceful fan palms.

GRAZING.

Lower California, as a whole, can never be very promising as a stock country. Except in the extreme northern portions, the thorny nature of the undergrowth, must prevent the successful raising of sheep for wool purposes, though mutton sheep would succeed admirably, were there a market for them. Horses, cattle and mules thrive. The common forage plant is the well-known "bunch grass" so common over the whole Pacific slope. It is not until after leaving San Borja, that the alfalfa, burr, and other clovers, alfilerillo, and other Upper California plants, acquire any importance. In the South, where severe droughts are not uncommon, and where, at times, the grass disappears entirely, stock does not suffer. Then tall animals fare the best. Several trees, of the acacia family, which never suffer from drought, which grow everywhere, and on which animals feed with avidity, then take the place of the ordinary pasture. The principal of these are the Mesquit and Lipna. We camped repeatedly where there was hardly a blade of grass in sight, and yet our mules had all the feed they wanted.

The high mesa lands about the summit of the Gigantea, and again between Sta. Gertrudis and San Borja, are said to be never affected by drought. The constant fogs keep the grass green nearly the entire year, and cattle flourish here, no matter how dry the season may be elsewhere. Still further North, between Rosario and San Diego, the country is so nearly like Upper California, and is subject to so nearly the same climatic laws, that it properly belongs with the Southern Coast range section of this State. It is a series of valleys scattered through the mountains, pretty well watered and sharing the fortunes of California, good and bad seasons.

FISHERIES.

Along the coasts, especially on the Pacific side, the whale fishery is an important interest. Most of the large bays, more particularly Magdalena and Scammon's and San Ignacio Lagoons, are visited by vessels year after year in search of whales which frequent these waters, probably for breeding. There are perhaps as many as from a dozen to twenty vessels engaged annually in this branch of enterprise. Seal fishing has also attracted some little attention, though not as much as it merits. Myriads of seals and sea lions line the shores and fall an easy prey to the hunter.

On the Gulf side, the pearl fisheries have been among the most famous in the world for more than a century. Ever since its commencement the annual yield has averaged nearly $30,000 per year, and it is still carried on with undiminished activity.

CONCLUSION.

By reading the foregoing imperfect sketch, it will be seen that while Lower California is by no means the faultless country it might be; while by far the greater portion can never be made available for either mining, agricultural, grazing or any other purposes; while its mines are few, its agricultural lands limited, and its supply of water small, still its position, its harbors, its climate and its resources are sufficient to give it a real, intrinsic value. From its position with relation to Upper California, it is much more an appendage to this State than to Mexico, out of sight across the "Sea of Cortez." It commands the mouth of the Colorado, and thus affects the trade of the great interior basin east of the Sierra Nevada. Its harbors are neither few nor small, and they have a direct value with reference to our trade and navy in the Central Pacific. Its agricultural products can be increased in quantity to an almost infinite degree; its fisheries are, as yet, in their infancy; and its mines alone would be sufficient reason for its acquisition by the United States. Further, everywhere, outside the moral influence of La Paz, the seat of government, the people are earnestly in favor of annexation, and I am by no means certain that a popular vote on the question would not result in a decided majority in favor of such a measure.

Commissioner Taylor's Report.

(Concluded from Page 33.

In regard to Mexico and South America, Humboldt estimated the annual produce of the mines of Spanish America at the beginning of the present century to be $43,500,000. This amount was increased from 1800 to 1809 fully reaching 50,000,000 per annum, but in the last mentioned year the contest began which terminated in the dissolution of the connection between Spain and her American colonies. The convulsions and insecurity arising out of this struggle, the proscription of the old Spanish families to whom the mines principally belonged, who repaired with the wrecks of their fortunes, some to Cuba, some to Spain, and some to Bordeaux and the south of France, caused the abandonment of several of the mines and an extraordinary falling off in the amount of their produce. There are no means of estimating the precise extent of this decline, but, according to Jacob, who collected and compared the existing information on the subject, the total average produce of the American mines, inclusive of Brazil, during the 20 years ending with 1829 may be estimated at $20,000,000 a year, being less than half their produce at the beginning of the century.

The discovery of new mines, and the greater cheapness and more abundant supplies of quicksilver obtained from California, have conspired, with other causes, to increase the produce of the South American mines, until, in 1867, they have nearly reached the productiveness of 1800; and the above estimate of their produce may be distributed as follows:

Mexico	$23,000,000
Peru	6,000,000
Bolivia	2,000,000
Chili	5,000,000
Other parts	4,000,000
Total	40,000,000

The latest and most satisfactory authority upon the production of Australia consists of a memorial from representatives of the different colonies to the home government upon postal communications between Australia and the mother country, dated April 1, 1867, in which occurs a table of exports of the associated colonies during 1865, giving the item of gold as follows:

Victoria	£6.190 317
New South Wales	2,647,868
New Zealand	2,226,474
Queensland	101,352
Total	11,165,811

It is a remarkable fact that the single colony of Victoria produced, in 1852, a gross amount of £14,886,799, far exceeding the entire aggregate from all the Australian colonies at this time. New South Wales, in 1852, produced £3,000,000 also in excess of the present productions of that colony. New Zealand has recently gone far to supply the deficiencies, and other gold fields are in course of discovery, and hence the foregoing aggregate of $61,000,000, adding to the exports of the different colonies about $6,000,000, may be accepted as a probable statement of the Australian treasure product.

The annual production of Russia was stated, in 1858, by J. R. McCulloch, in a treatise upon the precious metals, to be 87,500,000 francs, or £3,500,000, slightly exceeding the foregoing estimate. Late discoveries of placer mines upon the Amoor, in eastern Siberia, will probably lead, during 1868, to large additions to the annual average hitherto prevailing.

Mr. McCulloch estimated the total supply of gold and silver in 1858 as follows:

America, excluding California	$45,000,000
Asiatic Russia	17,500,000
Europe	7,750,000
California	70,000,000
Australia	55,000,000
Total	195,250,000

If to this amount we add $25,000,000, representing the production of Japan, China, India, Polynesia, and Africa, the total amount will be $220,250,000.

Great uncertainty attends the question of the probable production of the precious metals in the countries last named, described by M Chevalier as "countries imperfectly accessible to the commerce of the world." The French economist does not materially differ from the estimates of McCulloch in regard to America, Europe, and Australia, finding a total value of $202,000,000 for the year 1865; but his estimate of the oriental product far exceeds any English or American opinion upon that subject. For instance, he presents the following table:

Africa	$7,000,000
India	5,000,000
Polynesia	17,000,000
China	31,000,000
Japan	15,000,000
Total	75,000,000

M. Chevalier thus obtains the annexed aggregate for the entire product of the globe after 1848 and before 1865:

European and American	$202,000,000
Asiatic and African	75,000 000
Total	227,500,000

He supplements this statement by the total quantity which

from 1848 to 1864, or during 17 years, was placed at the disposition of the world:

Silver - - - - - - - - -	$1,100,000,000
Gold - - - - - - - - - -	3,000,000,000
Total - - - - - - - -	4,100,000,000

Except for the high estimate for Asiatic production there will be no material dissent from the foregoing conclusions of Mr. Chevalier. All modern experience indicates that the era of placer mining is soon terminated, and must have long since passed away in Asiatic countries. There is little evidence of elaborate methods either of alluvial or mechanical mining, and the sum of $25,000,0000 per annum is therefore submitted instead of $75,000,000 as the production of gold and silver beyond the great mining centres.

If we grant the accuracy of M. Chevalier's estimate of the total amount of gold and silver in 1848, and assume that the sum of $250,000,000 per annum will be the average annual production from 1843 to 1880, it will then require the period between those dates, or 30 years, to duplicate the world's supply of precious metals.

The activities of commerce and the developments of human industry, accelerated beyond all former precedent by the progress of the arts, will probably prove sufficient for the absorption of this vast quantity of the precious metals without convulsion of prices or values. The cotton trade with India transferred within seven years $500,000,000 almost entirely in silver. The extension of railways and the construction of works of irrigation in India have absorbed another $500,000,000 of English capital, and there are evidences that the accumulation of European and American wealth are henceforth to be diffused under ample international guarantees over all the continents. If so, there will be ample room and demand for any apparent excess of the precious metals. Europe and America will substitute gold for silver as money, while Asia will probably continue to absorb silver for many years to come, before the ratio of currency to population now existing in Europe shall extend over the eastern world.

A brief statement will illustrate the extent of the oriental demand for precious metals, which, now mostly confined to silver, will hereafter, or as soon as the world shall desire it, extend to gold. India, in 1857, had a circulating medium of $400,000,000 for the use of a population of 180,000,000, or $2.22 per capita. France has a population of 38,000,000, with a money supply of $910,000,000, or $24 per capita. Suppose China, Japan, and the other industrious populations of Asia to be in the situation of India, and that the current of bullion since 1853 has supplied the Asiatics with $3 per capita, there yet remains a difference of $21 per capita before the monetary level of France is attained, demanding a further supply of $21 per capita over a population of 600,000,000, or not less than $12,600,000,000.

The railway system will soon connect Europe and Asia, and constitutes a most important agency for the transfer of capital and distribution of money among the population of the eastern continent. Since the suppression of the Indian mutiny an English writer estimates that more than £100,000,000 sterling have been added to the currency and reproductive capacity of India, mostly from England, in the construction of railroads and canals. There were 3,186 miles of railway in operation in 1865, having cost $86,000 per mile, and having been constructed with the aid of a guarantee of five per cent. to stockholders by the province of India. The system for which the government indorsement is already given will be 4,917 miles of railway, at an estimated cost of £77,500,000. These roads will relieve the government of liability when their earnings reach £25 per mile per week, a point which the leading lines have nearly reached, and which all are destined to attain. Such is the success of Indian railways that their connection with Europe by the valley of the Euphrates, and their extension into China, will probably be accomplished within the next ten years. By that time Russia will have undertaken a railway from Moscow to Pekin, through southern Siberia—a great trunk line that would soon justify a series of southern lines penetrating central Asia over those leading caravan routes which have been the avenues of Asiatic commerce for centuries.

If an investment of $430,000,000 in 5,000 miles of railway is financially successful in Hindostan at this time, it may be anticipated that a population of 180,000,000 will warrant the enlargement of the system within the present century fully four-fold, which would be a fifth of similar communications required and supported by an European or American community. Suppose such a ratio of railway construction extended over China, central and western Asia, and Siberia, it would be only one mile for every 9,800 people, while in the United States there are 36,000 miles for 36,000,000 people, or a mile to every thousand; and yet the Asiatic ratio, moderate as it is, presents the startling result of 66,000 miles of railroad constructed by the expenditure of $5,676,000,000. Such a disbursement of European accumulations in Asia would go far to diffuse not only the blessings of civilization, but any excess of production of the gold and silver mines of the world.

In Australia a railway has been constructed from Melbourne to the Ballarat gold fields, 380 miles, at a cost of $175,000 per mile, which pays a net profit nearly equal to the interest on the immense investment. It is difficult to estimate the amounts destined to be absorbed for railways in all the continents, under the direction of the powers of the world—projected, constructed, and administered by the wealth and intelligence of America, Russia, England, Germany, and France.

GEBERAL OBSERVATIONS.

It is deemed expedient to reserve for a subsequent report the detailed statements of mining enterprises east of the Rocky mountains. Many of the organizations for quartz mining in Colorado and Montana yet await the results of scientific investigations into the best methods of reducing the ores of gold and silver; while in the Alleghany district other causes have intervened to postpone a large number of mining operations. The summer of 1868 will doubtless supply the materials of a full and comprehensive report upon this topic.

The act of July 26, 1866, extending facilities for acquiring titles to mineral lands, marks a most important epoch in the progress of mining enterprise upon this continent. Secretary McCulloch, in his report of 1865, suggested that the principle of pre-emption, so long applied to the sale of agricultural lands in the west, should be extended in favor of the holders of claims to gold and silver mines on the public domain. A bill to this effect was furnished to Senator Sherman, which, after much discussion, was matured into the act of July 26, 1866. Under the careful instructions of the Commissioner of the General Land Office, this legislation has been received with great favor on the Pacific slope. By its provisions freedom of exploration, free occupation of government lands for placer mining, a right to pre-empt quartz lodes previously held and improved according to local customs or codes of mining, the right of way for aqueducts or canals, not less essential to agriculture than to mining, and the extension of the homestead and other beneficent provisions of the public land system in favor of settlers upon agricultural lands in mineral districts, have been established as most important elements for the attraction of population and the encouragement of mining enterprises. The Commissioner of the Land Office has carefully analyzed this enactment, and greatly facilitated its execution by a circular recently issued. The spirit of the legislation under consideration is in the interest of actual settlement and occupation, and adverse to the ownership for merely speculative purposes of mining properties. It will probably be necessary to supplement the act in question by some general revision of the local mining customs, which, although generally founded on the Spanish code so long in use in Mexico, are often incongruous and obscure.

The most practicable and economical methods of desulphurizing the refractory ores which characterize the Atlantic mines having been made by the Secretary a special subject of inquiry, no effort will be made on the present occasion to anticipate its progress and conclusions.

I beg leave to renew a former suggestion, that the metalliferous localities of the Alleghanies south of the Potomac river shall be carefully explored under national auspices. JAMES W. TAYLOR.

Hon. HUGH MCCULLOCH, Secretary of the Treasury.

Steel by Friction.

A cotemporary is responsible for the following: At a recent *conversazione* of the London Institute of Civil Engineers, a curious process for manufacturing steel by friction was explained and commented upon. By the aid of machinery, pig iron is ground to powder by a rapidly moving cutter. The great amount of friction generated produces a heat so intense that the iron is set on fire, and after scintillating falls down as reddish-brown dust, the combustion having caused the riddance of the superfluous carbon. The dust is collected, put into a crucible, melted, and when cooled is found to form ingots of steel of superior quality.

Patent Claims.

Interesting to Miners, Millmen, Metallurgists, Oil-Men and Others.

79,314.—MAKING STEEL DIRECT FROM THE ORE.—Thos. J. Chubb, Williamsburg, N. Y. Antedated Jan. 15, 1868.

1 claim, 1st, The arrangement and employment of fuel supporters, a a, and d d' a, for the purpose set forth.

2d, The arrangement and employment of stirrers and conveyers, b b b, for the purpose set forth.

3d, The process of decomposing mineral substances by currents of heated gas or gases passing through and among finely divided particles of the same, substantially as described and herein shown and for the purpose set forth.

4th, The carbonization of iron or iron sponge, or the metallic particles therein by a current or currents of heated gas or gases, as herein described, passing through and among finely divided particles of the same, substantially as described.

5th, The steel melting chamber, O, in combination with a heat-reclaiming apparatus or furnace.

6th, The process of making cast steel, in combination with a heat-reclaiming and regenerative apparatus or furnace.

7th, The employment of alluminous substances, such as fire clay crucibles, as a substitute for plumbago crucibles, for making or melting steel therein, in combination with a gas generative furnace and a heat-reclaiming apparatus.

8th, The employment of a stationary melting chamber, vessel or furnace, in combination with the appurtenances employed in the process of decomposing or deoxidizing iron ore, and carbonizing the metallic particles thereof.

9th, The employment of a stationary melting chamber, vessel, or furnace, in combination with the process or processes of decomposing or deoxidizing iron ore, and carbonizing the metallic particles thereof.

10th, The process herein described of decomposing or deoxidizing iron ore and carbonizing the metallic particles thereof.

11th, The process herein described of making cast steel direct from the ore.

12th, The employment of coal tar, rosin, petroleum oil, or the gas or gases thereof, for the purpose set forth.

13th, The employment, in the deoxidizing chamber, in combination with carbon, of ammonia, or some ammoniacal compound, or of fusible compounds of cyanogen, or the gas or gases therefrom, to facilitate the conversion of iron ore, or iron or steel sponges, into molten or cast steel, substantially as described.

14th, The employment of the chamber, A A', in the manner described, and the appurtenances and process employed therewith, for the purpose set forth.

15th, Deoxidizing and carbonizing iron ores in a chamber separate from and previous to melting the same in a cupola or a blast furnace, substantially as described

16th, The combination of the process or processes of deoxidizing and carbonizing iron ores with the process or reducing and melting the metallic particles thereof, in a cupola or a blast furnace.

17th, The arrangement of a melting or re-melting and refining chamber, as described, in combination with a cupola or a blast furnace, (figs. 3 and 4.)

18th, The combination of the process of reducing iron ores, and melting the metallic particles thereof in a cupola or a blast furnace, with the process of melting or re-melting and refining, substantially such as herein described.

19th, Producing refined iron or steel by the process of deoxidizing and carbonizing the ore in a separate chamber and melting the metallic particles thereof in a cupola or a blast furnace, substantially as described and shown, (figs. 4 and 6.)

20th, Producing refined iron or steel by the process of reducing the ore, and melting the metallic particles thereof in a cupola or a blast furnace, and re-heating and refining the same in a melting or re-melting and refining chamber, substantially such as is herein described.

21st, The arrangement or employment of an air-heating and gas-heating or re-heating apparatus, in combination with a cupola or blast furnace, for the purpose set forth.

22d, The arrangement or employment of an air-heating and a gas-heating or re-heating apparatus, in the process or processes of deoxidizing and carbonizing iron ore, substantially as described.

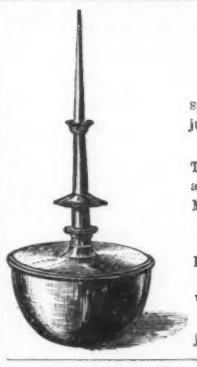
23d, The employment of the chamber, C, in the manner described, and the appurtenances and process employed therewith for the purposes set forth.

All Sorts.

☞ A mutilated United States note, if less than one-twentieth of the note is missing, can be redeemed on presentation to any of the sub Treasurers; but if more than one twentieth of the note is gone, and there is no proof that the missing portion has been destroyed, the fragment can be redeemed only at the Treasury at Washington, where the proportionate value will be given, reckoning the twentieths. So, also, with compound interest and other interest-bearing notes of the Government. Unmutilated fractional currency, when properly assorted, and in sums less than $3, will be redeemed by any of the Assistant Treasurers of the Government. When mutilated the same rule holds as for United States mutilated notes on demand, in lawful money, if it has no reason to believe that the missing portions of the note can be used to defraud. If the banks, in redeeming notes, allow full value for them when returned to them, the Comptroller will allow full value for them when returned to him.

☞ The Bethlehem *Times* says that about three and a half miles from Allentown, on the Lehigh Mountain, in Salisbury township, Lehigh county, Pa., is situated a big rock, or rather a pair of rocks, to which an annual pilgrimage is made with as much regularity as are the pilgrimages of the worshippers who wend their weary way to Mecca. These rocks are situated on the highest point of the Lehigh Mountain, and command a view of the surrounding country, which is only bounded by the power of the human eye. The height of these rocks from the base to the highest part is nearly fifteen feet, while they are 1,260 feet above water level. Their average circumference is about sixty feet.

☞ In France the greatest distance over which a telegraphic message can be transmitted is about 600 miles; in Prussia, about 560; in Belgium, about 160; and in Switzerland, about 200 miles. The charge for a message of twenty words over the greatest distance in France is 1s. 8d.; in Prussia, 1s. 6d.; in Belgium, 5d.; and in Switzerland, 5d. In Great Britain 2s. is charged for the transmission of a message over 500 or 600 miles, and 1s. 6d. for any message sent 160 or 200 miles.



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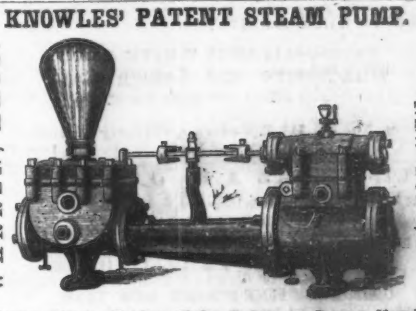

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THOMAS SPROULL, President.
je27:4t S. R. HUTCHINSON, Secretary.

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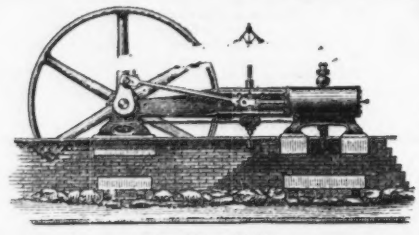

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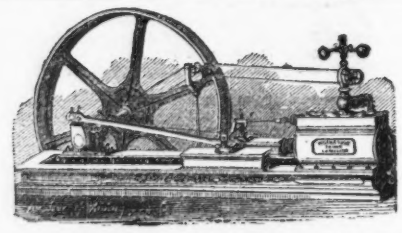

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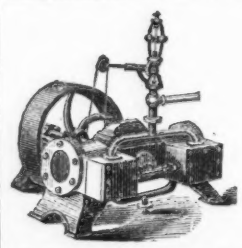

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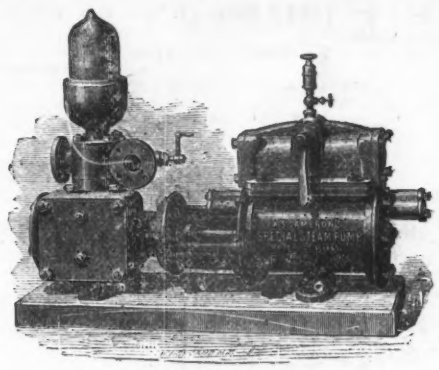

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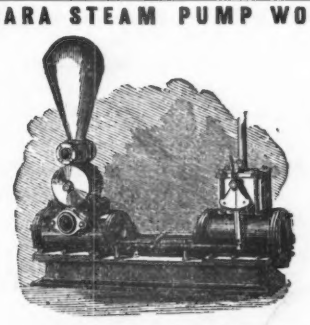

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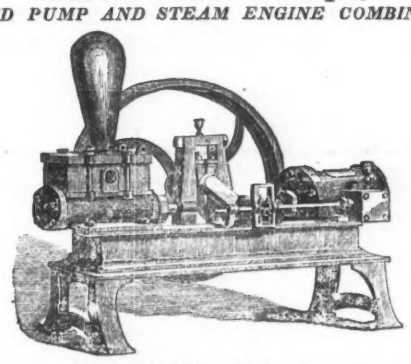

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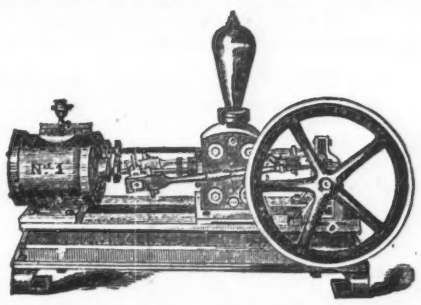

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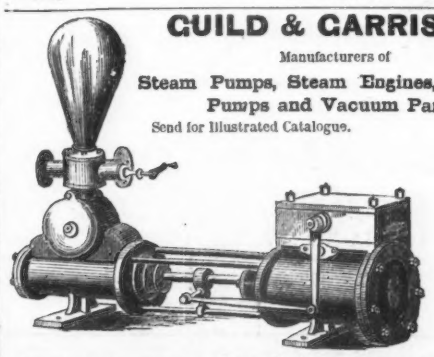

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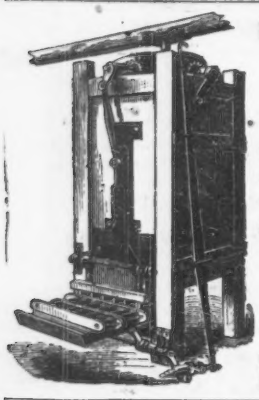

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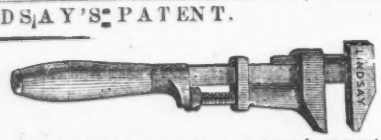

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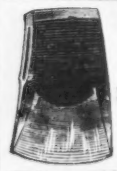

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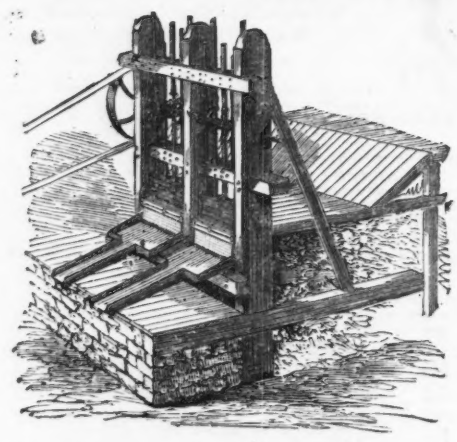

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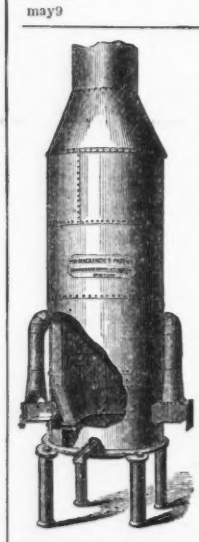

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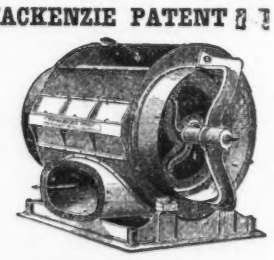

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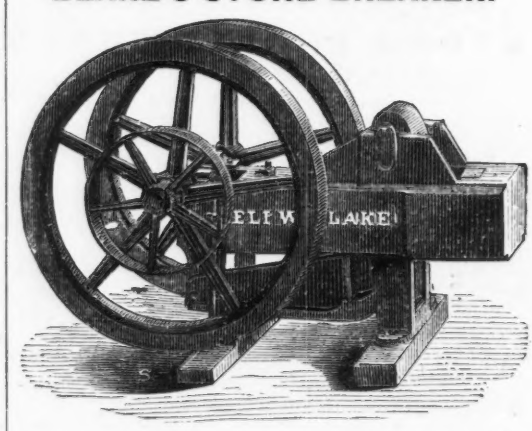

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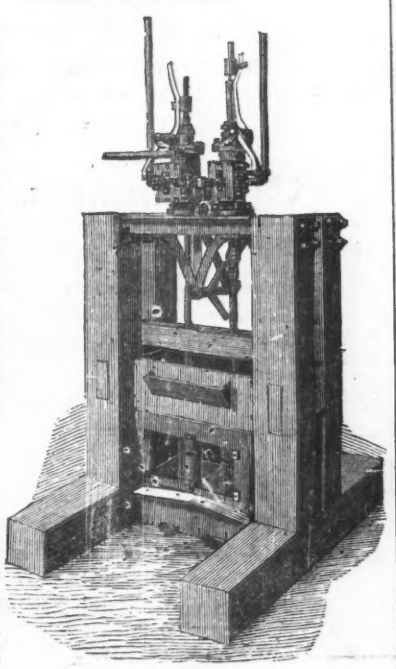

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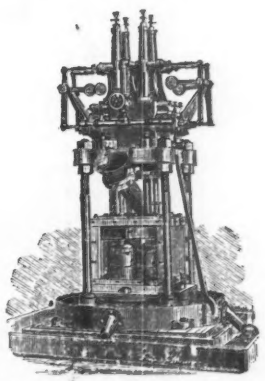

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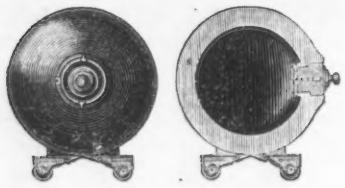

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